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January/February 2020

This 4,300-year-old
Egyptian tomb is
one of the

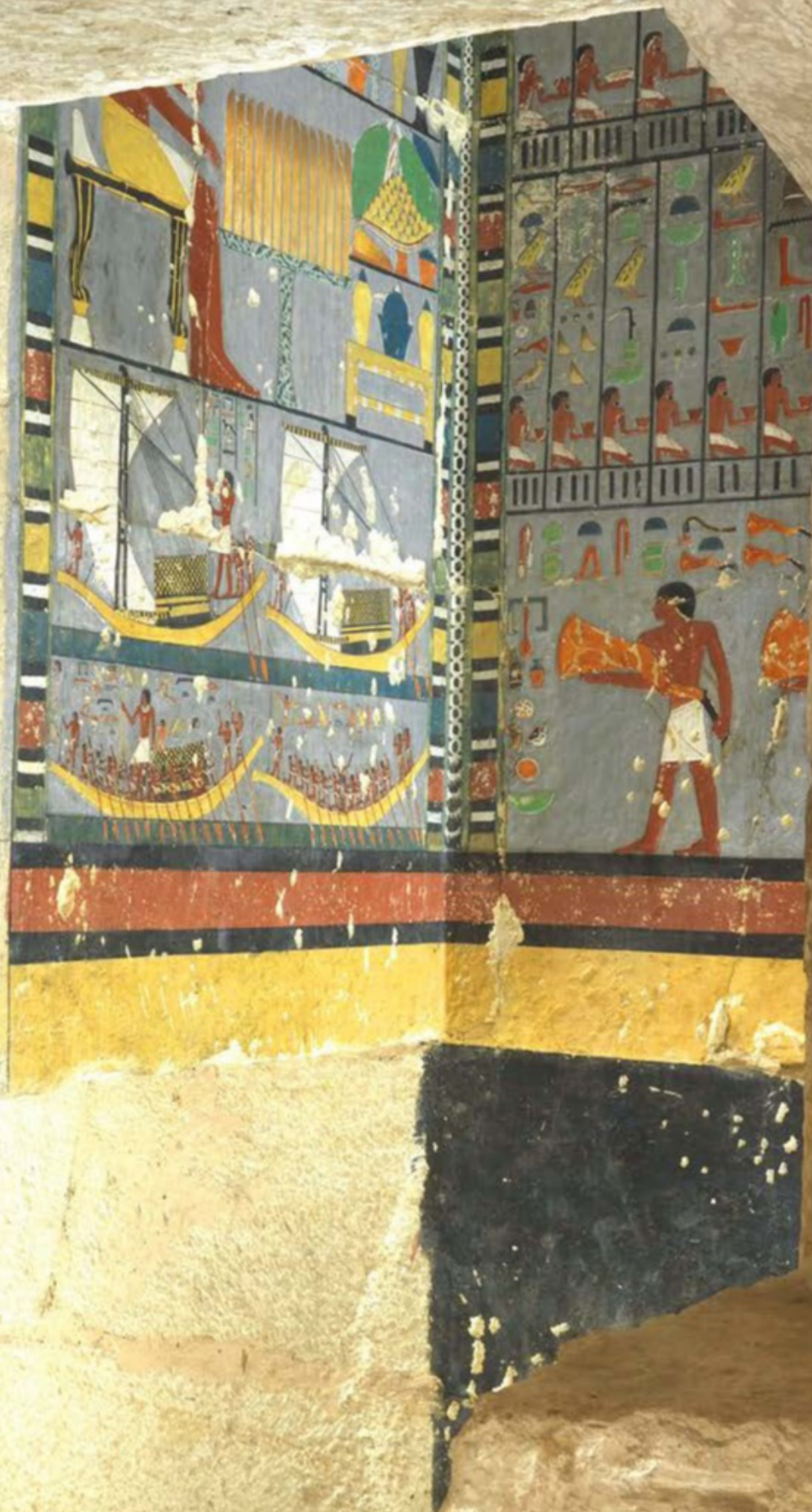
TOP 10 DISCOVERIES OF 2019

The End of the
Inca Empire

Japan's
Sacred Island

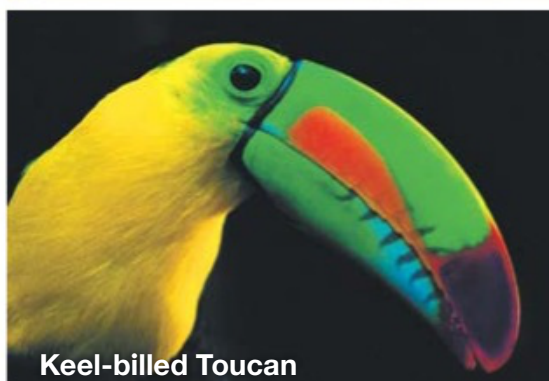
A Notorious
Irish Prison

PLUS:
Viking Identity Crisis
Assyrian Astronomers
Herodotus' Nile Cruise
Bringing up Bronze Age Baby





Manuel Antonio National Park



Keel-billed Toucan



Capuchin Monkey



Morpho Butterfly



Three-toed Sloth



Birdwatching at Caño Negro

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Day 8 Manuel Antonio

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Day 9 San José

Tour ends after breakfast. Caravan provides airport transfers. Thanks for vacationing with Caravan!

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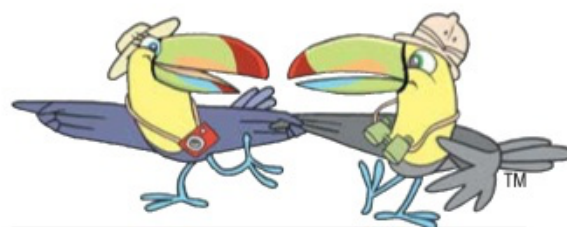
- 1, 2 **San José** Barcelo Palacio
- 3, 4 **Fortuna** Magic Mountain
- 5, 6 **Guanacaste** J.W. Marriott
- 7 **Manuel Antonio** San Bada
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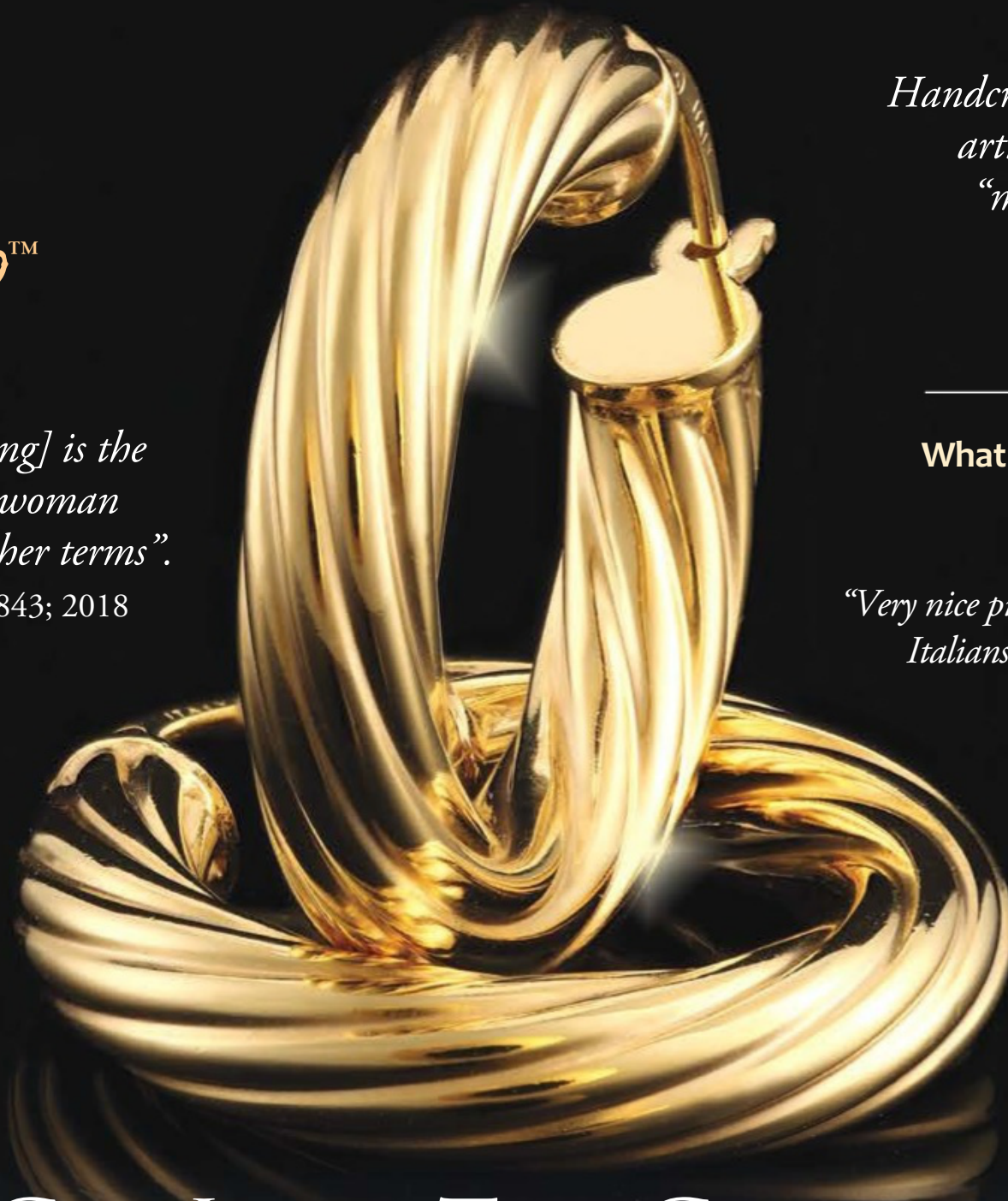
BY ROGER ATWOOD

Cover: The newly discovered Old Kingdom tomb of Khuwy, Saqqara, Egypt
PHOTO: COURTESY MOHAMED MEGAHED

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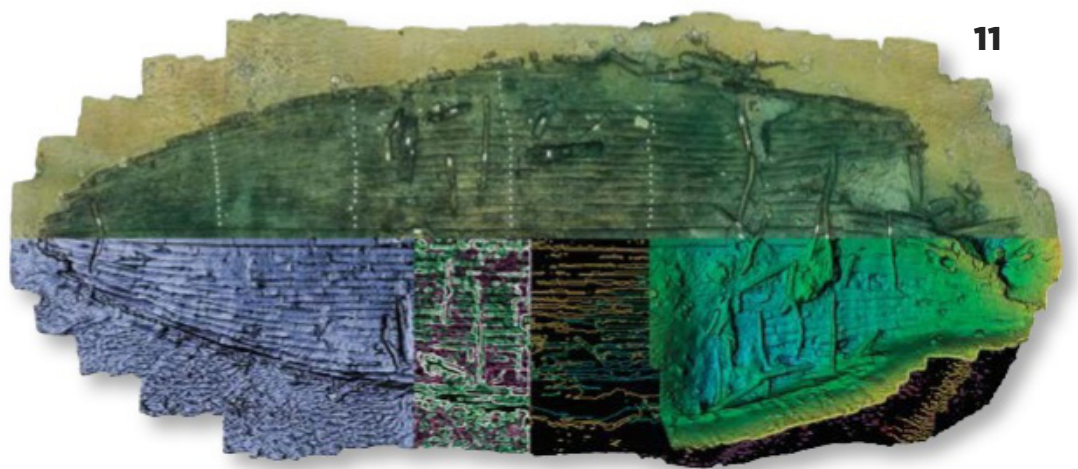
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Millions were forced to flee during the Great Famine—some of those left behind were condemned to Ireland's most notorious prison

BY JASON URBANUS

ARCHAEOLOGY.ORG

■ **MORE FROM THE ISSUE** To see 3-D models of ancient Maya stelae from the site of Witzna, go to archaeology.org/witzna. To read about an enigmatic structure near the "Temple of the White Thunderbird," go to archaeology.org/bridge.

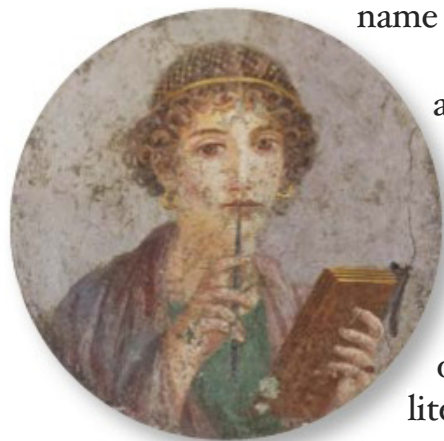
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BEYOND THE TRENCHES

In this issue, longtime readers of *ARCHAEOLOGY* may notice subtle but, we feel, significant changes to two of our most popular sections. Rest assured that the depth and diversity of the magazine's coverage will remain the same, but you will now find our news section, formerly known as From the Trenches, under the title Digs & Discoveries. And readers who enjoy our global map pinpointing recent finds can now locate World Roundup under the name Around the World.



Since we introduced maps in many of our articles a little less than a year ago, dozens of readers have shared with us how much this has enriched their experience of the magazine, and we believe referring to this section as Around the World expresses this cartographic emphasis. The impetus behind Digs & Discoveries, on the other hand, was motivated by seismic changes in the field of archaeology itself. So many exciting discoveries are now made not only in excavation trenches, but also by researchers studying satellite and drone images, by scholars working in museums where they reexamine artifacts from previous excavations and arrive at entirely new conclusions, and by scientists in laboratories uncovering new details about the past without ever moving an inch of soil.

Another important development in the field is the focus many archaeologists now place on identity, and you'll find this theme running through many of our stories. In both "The Man in Prague Castle" and "Friend? Roman? Countryman?" you will read about scholars who have examined previously excavated skeletons—one unearthed more than a century ago, and one discovered just over a decade ago—and brought new questions to bear, including what constituted identity in antiquity. Can it be determined from artifacts found in a burial? From the burial's location? Or is it ultimately derived from a person's DNA or the isotopes in their teeth? The theme of identity is also central to "Japan's Sacred Island," which explores archaeologists' efforts to learn about the early history of the nation that would become Japan by examining thousands of objects left by voyagers over some 500 years on the island of Okinoshima.

Of course, we haven't made any changes to the title of one of the magazine's best-loved recurring features, which speaks for itself. In this issue, we bring you our annual "Top 10 Discoveries." It is, as always, filled with the most fascinating, surprising, and entertaining archaeology stories of the past year, including the extraordinary Old Kingdom Egyptian tomb featured on the cover. We know you will agree that 2019 was an amazing year for archaeology and for *ARCHAEOLOGY*.

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FROM THE PRESIDENT

DEAR READER,

As a longtime *ARCHAEOLOGY* subscriber, I am delighted to introduce myself to you as the incoming president of the Archaeological Institute of America (AIA), the organization that publishes this magazine. The AIA is the oldest and largest archaeological organization in North America, made up of professional archaeologists and lay enthusiasts who belong to more than 100 affiliated local societies across the United States and Canada. One of these societies is likely located near you. There, you can meet archaeologists and hear them talk about their work through the AIA's lecture program, which sponsors more than 200 events every year. One of my ambitions as president is to tap this deep well of expertise and make it accessible to



Laetitia La Follette
talking to her
students about the
Parthenon

an even broader audience via podcasts and other media.

I caught the archaeology “bug” in the sixth grade. Because my first name, Laetitia, is Latin for “joy,” my friends joke that it was clear from birth that I would go on to study classical antiquity. Archaeology is, as you know, a field that encompasses all sorts of specialties. It is also a field based on collaboration—no archaeologist can do it alone. Over the course of my own archaeological adventures, I’ve had some amazing mentors: an architect and archaeological draftsman in Athens, an underwater archaeologist in Israel, a Torlonia princess in Rome, and, most recently, several Danish colleagues in Copenhagen. Each in his or her own way helped me tremendously, and I am grateful to them all.

Such collaborations are key to the future of the field. I invite you to deepen your connection to archaeology this year in one of several possible ways: Find a society near you and attend a lecture there, explore some of the AIA's public programs like *Skype a Scientist*, or introduce a young person to this magazine. You can learn more about these programs at archaeological.org. Together we can do great things. I look forward to working with you over the next three years as we support archaeology in the Americas and worldwide.

A handwritten signature in black ink that reads "La La Follette". The signature is written in a cursive, flowing style.

Laetitia La Follette

First Vice President, Archaeological Institute of America

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FROM OUR READERS

WHAT MAKES A WITCH?

“Searching for the Witches’ Tower” (November/December 2019) rightly identifies the role of King James I in promoting the eradication of witchcraft in seventeenth-century England, but does not mention the impact of the King James Version of the Hebrew Bible. The Bible’s publication at about the same time as the 1612 Lancashire witchcraft trials replaced the Hebrew words for idolaters, mediums, sorcerers, and ghost whisperers with the English word “witch.” In Hebrew, there was no such word as “witch.” Early Greek and Latin translations of the Hebrew also did not use the word “witch.”

An example of this usage can be found in 1 Samuel, chapter 28, in which the King James Bible has Saul going to the witch of Endor to contact the spirit of Samuel, while the Hebrew, Greek, and Latin versions have Saul visiting “a woman with a divining spirit.” She contacts the spirit of Samuel and also shows considerable care regarding the devastating news that Saul receives about his upcoming battle with the Philistines. She hardly acts the role of a witch. The

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King James Bible conditioned Puritans and Anglicans alike to be obsessed with demons and witches, thus prolonging a medieval mind-set among common folk.

*Salvatore Prisco
Professor Emeritus, Humanities
Stevens Institute of Technology
Hoboken, NJ*

As an ex-Lancashire lad, I enjoyed your article on Pendle Hill and the Lancashire Witches. This is an area that adjoins the “Wuthering Heights” region of Yorkshire of Brontë novel fame. Left unmentioned is the common folklore associated with present-day “Lancashire Witches.” As kids we would watch the skies on a moonlit night looking for the infamous witches flying through the cloud-swept heavens, blown along by the seasonal gales bellowing in off the Irish Sea.

On those magical nights the earth felt alive with a wondrous, mystical energy—the witching hours. Our elders assured us that the witches soaring through the skies were nothing but gorse bushes tossed aloft by the gale-force winds, not old hags riding broomsticks. We would gladly snuggle in our beds enjoying the sounds of the wind “wuthering” down the chimney.

*Christopher Lyon
Newport Beach, CA*

BOTTOMS UP

As I read your interesting article (“Proof Positive,” November/December 2019),

I had a memory of a story in this magazine a few years ago about a professor from the University of Pennsylvania recreating ales using recipes he developed by studying ancient drinking vessels. These ales are served at the Dogfish Head Brewings & Eats in Rehoboth Beach, Delaware. We found the restaurant and ordered samples of all the ales and a terrific lunch. Thank you for both “Proof Positive” and the previous article.

*Clare Geiser
Staten Island, NY*

University of Pennsylvania biomolecular archaeologist Patrick McGovern continues to investigate ancient (and modern) libations.—The Editors

WEBSITE SHOUT-OUT

Nightly for the past several years, I’ve read the well-written, insightful overviews of recent archaeological discoveries that you craft and publish at archaeology.org. This is my last online activity for the day. I just wanted to let you know how much I value and enjoy your work, and how much I appreciate the knowledge and skill it takes to research, compile, craft, and proofread these reviews. Thank you, ARCHAEOLOGY magazine online content writers and editors, for consistently making my day better. My sole regret is that you don’t publish these on weekends and holidays!

*Frank Pore
Fuquay-Varina, NC*



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DIGS & DISCOVERIES

EARLY MAYA WARFARE, ANCIENT ROMAN BATHING, VIKING DRINKING HALL...AND MUCH MORE

THE MAN IN PRAGUE CASTLE

In the aftermath of World War I, as a result of the collapse of the Austro-Hungarian Empire, several new countries were created in Central Europe. In a quest to define themselves, they sought new national stories. However, such narratives are often not new at all. Instead, they hark back to a past that is sometimes part mythology, part history—but always potent. At the heart of Czechoslovakia's national story was a 1,000-year-old skeleton of a warrior buried with his weapons deep within the oldest part of Prague Castle.

For almost a century, the shifting interpretations of this man's identity have reflected the cataclysmic political upheavals of the twentieth century—from the Nazi occupation to the era of Soviet domination and, finally, a return to independent statehood.

Recently, a team of archaeologists including Nicholas Saunders of the University of Bristol, Jan Frolík of the Czech Academy of Sciences, and Volker Heyd of the University of Helsinki reengaged this topic. "Physical remains stay the same, but our interpretations of them reflect and reinforce views and attitudes of the time in which we make them," Saunders says. "We wanted to explore issues of contested identity across the twentieth century and the role of conflict and political ideologies in the manipulation and creation of the past in the present." The Prague Castle skeleton provided them with the perfect case study.

An excavation was begun in 1925 to pinpoint the earliest remains of Prague Castle, which had become the seat of government of the new post-World War I state. The body was found on the edge of a graveyard within the castle grounds dated, at the time, to between A.D. 800 and 1000. Along with the body were an ax, two knives, a badly corroded

Warrior burial, Prague Castle



sword, a leather pouch containing a decorated fire-striker and a small flint, and other assorted metal objects. The man was tentatively identified as Bořivoj I or his son Spytihněv I, members of the Slavic Přemyslid Dynasty that ruled the region around Prague from the ninth to early fourteenth centuries, explains Frolík.

Just over a decade after this identification, the Nazis invaded Czechoslovakia. Nazi scientists accused the original excavator of hiding the man's true identity and declared, on the basis of the artifacts, that the man had actually been a Viking, not a Slav. In Nazi ideology, says Saunders, Viking, Nordic, and Germanic identity was conflated to justify German occupation and control of Eastern Europe, as well as the Nazi extermination of Slavs, Jews, and other populations they deemed inferior.

After the Germans were defeated, the Communist Party came to power in Czechoslovakia and the nation became a satellite state of the U.S.S.R. Seen through the eyes of the country's new Slavic Soviet masters, the warrior buried in Prague Castle was once again deemed a Slav. He was also once again identified as a member of the Přemyslid Dynasty.

For decades the skeleton remained in storage. After the breakup of the Soviet Union in 1991, the new state of Czechoslovakia reinvented itself. Yet again the warrior was placed at the core of the nation both literally—in 2004 his remains were put on display in the castle—and psychologically. “The grave is clearly that of an important person from the beginning of Prague Castle,” says Frolik, “and therefore indirectly also the beginnings of the Czech state.”

Frolik has completed DNA studies in an attempt to establish the identities of several other medieval skeletons excavated in the castle, including one he suggests may be the son of the



Prague Castle

early Přemyslid prince Boleslav I, and another interred next to him that may be his wife. However, DNA and isotope studies, as well as CT scans, on the warrior have not yet been completed. In any case, explains Saunders, biological reality is not the only reality. “Scientific analyses can tell, often in fascinating detail, one kind of truth about an individual, such as where he grew up, but they cannot tell us how he was perceived at the time,” says Saunders. “Perhaps we are asking twenty-first-century questions of a thousand-year-old body that do not accurately reflect how he saw himself and was regarded by others.”

—JARRETT A. LOBELL

OFF THE GRID MALINALCO, MEXICO

The town of Malinalco, just over two hours southwest of Mexico City by car, is home to two historic sites that may seem to represent distinct worlds. The first is a complex built by the Aztecs between 1476, when they conquered the region, and 1519, when the Spanish arrived. The complex’s main temple, named Cuauhcalli, or “House of the Eagles,” was built directly into a hillside. It is the only example of such rock-cut architecture in the Aztec world, and one of only a handful in the Americas.

The other site is the Augustinian monastery of San Cristobál, now called Divino Salvador, which was built in 1540 and is still in use today. The monastery features vivid murals of biblical scenes that were painted by subjugated Aztecs shortly after its founding. Art historian Manuel Aguilar-Moreno of California State University, Los Angeles, says that native people wove traditional Aztec religious and cosmological beliefs into this artwork. “Many aspects of Aztec religion have parallels in Christianity,” he says, “and one such parallel is expressed at both the monastery and Cuauhcalli.” Iconography at the temple suggests that it was dedicated to the Aztec sun god, Huitzilopochtli, who is often depicted as an eagle and was said to have been born to a virgin mother.

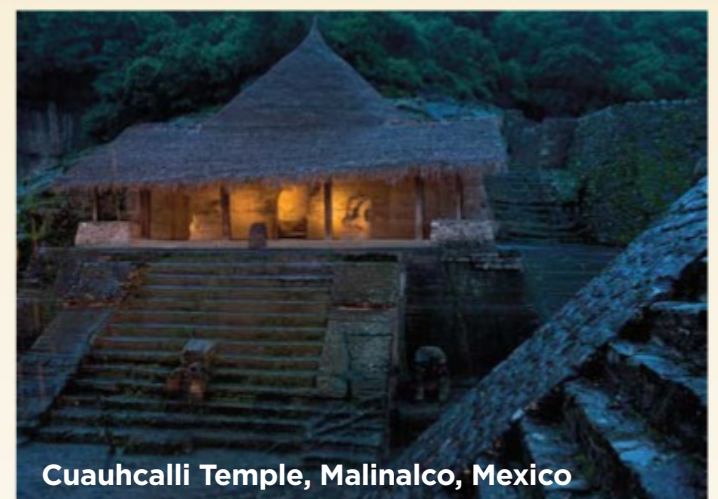
THE SITE

Begin your Malinalco experience by climbing up a hill known as the Cerro de los Idolos to reach the Aztec ruins 700 feet above the town. Cuauhcalli stands atop a pyramid platform and is guarded by now-headless statues of jaguars. The temple’s doorway was designed to mimic a serpent’s open mouth. Its interior features motifs, carvings, and animal-shaped thrones, all of which served as avatars for gods. The thrones were

also the setting for rituals involving the Aztec eagle and jaguar warriors. In the center of the temple, an eagle sculpture faces the doorway, which Aguilar-Moreno says represents Huitzilopochtli emerging into the world to lead the conquering Aztecs to the promised land. He recommends spending a few hours taking this all in before returning to town to see the monastery. There, a mural of the Garden of Eden—the concept of an earthly paradise was shared by the Aztecs and the Spanish friars—is resplendent with local Mexican animals and plants.

WHILE YOU’RE THERE

Though it boasts a burgeoning restaurant and boutique hotel scene, Malinalco has



Cuauhcalli Temple, Malinalco, Mexico

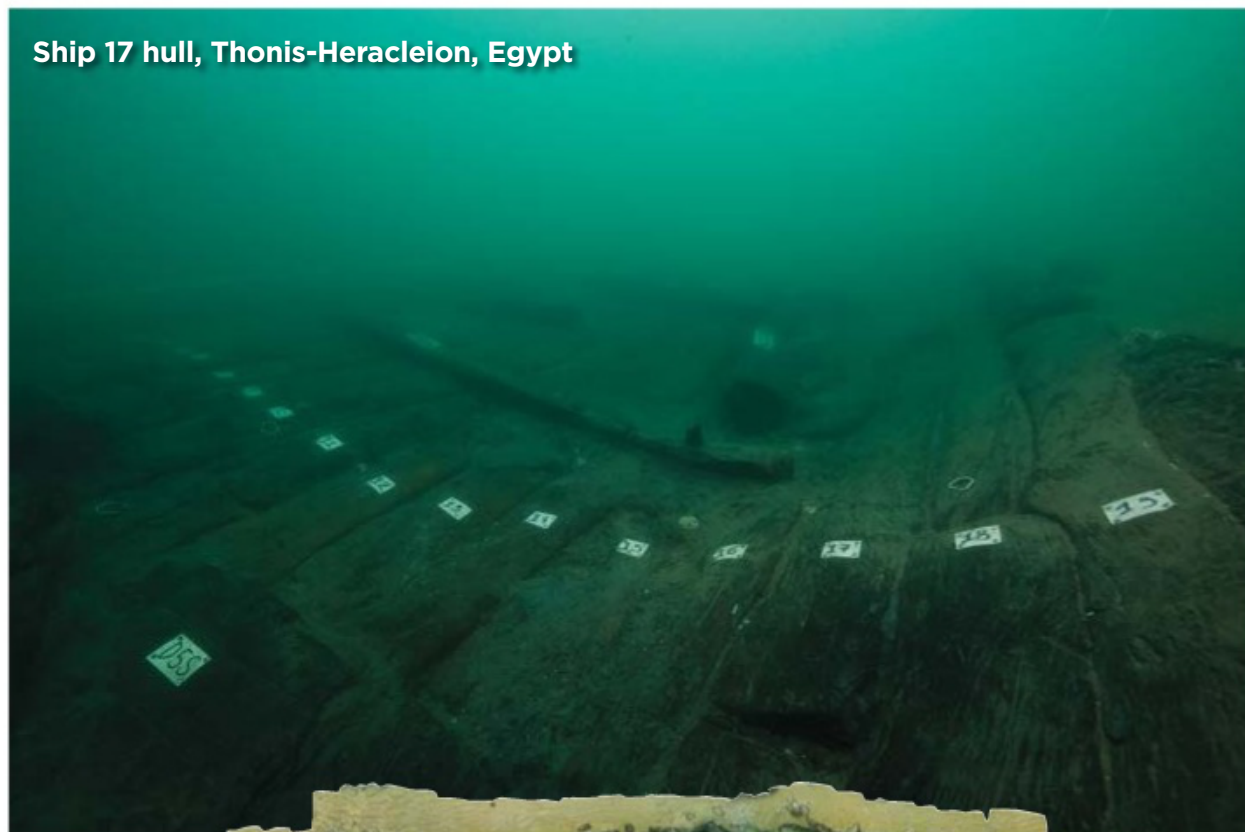
retained its traditional sixteenth-century layout, and residents still identify strongly with their own barrios. Between meals, be sure to visit the various barrio chapels, each of which is dedicated to its own patron saint.

—MARLEY BROWN



AS TOLD BY HERODOTUS

Ship 17 hull, Thonis-Heracleion, Egypt



Digital rendering of Ship 17



Their boats with which they carry cargoes are made of the acacia, of which the form is most like that of the Cyrenean lotus, and its sap is gum. From this acacia, then, they cut planks two cubits long and arrange them like bricks, building their ships in the following way: on the strong and long tenons they insert two-cubit planks.

Herodotus, *Histories*, Book 2, Chapter 96

For the first time, researchers working in a ship graveyard in the ancient Egyptian port city of Thonis-Heracleion have identified a vessel precisely matching the firsthand description given by the fifth-century B.C. Greek historian Herodotus of a common type of Egyptian cargo ship known as a *baris*. “It’s a very rare case when a written source and archaeological material make such a perfect match,” says archaeologist Alexander Belov of the Russian Academy of Sciences. The short, thick planks of local acacia wood that form the hull of what is known as Ship 17 are arranged in the staggered, brick-like pattern described by Herodotus, and its keel contains a shaft that the historian notes held a rudder.

Dozens of other similar *barides* that remain submerged at the site appear to have been discarded after years of transporting goods on the Nile, Belov explains. Ship 17, which was sunk before the mid-fourth century B.C. and pinned to the seabed with wooden poles, seems to have been used to increase the length of a nearby pier.

—BENJAMIN LEONARD

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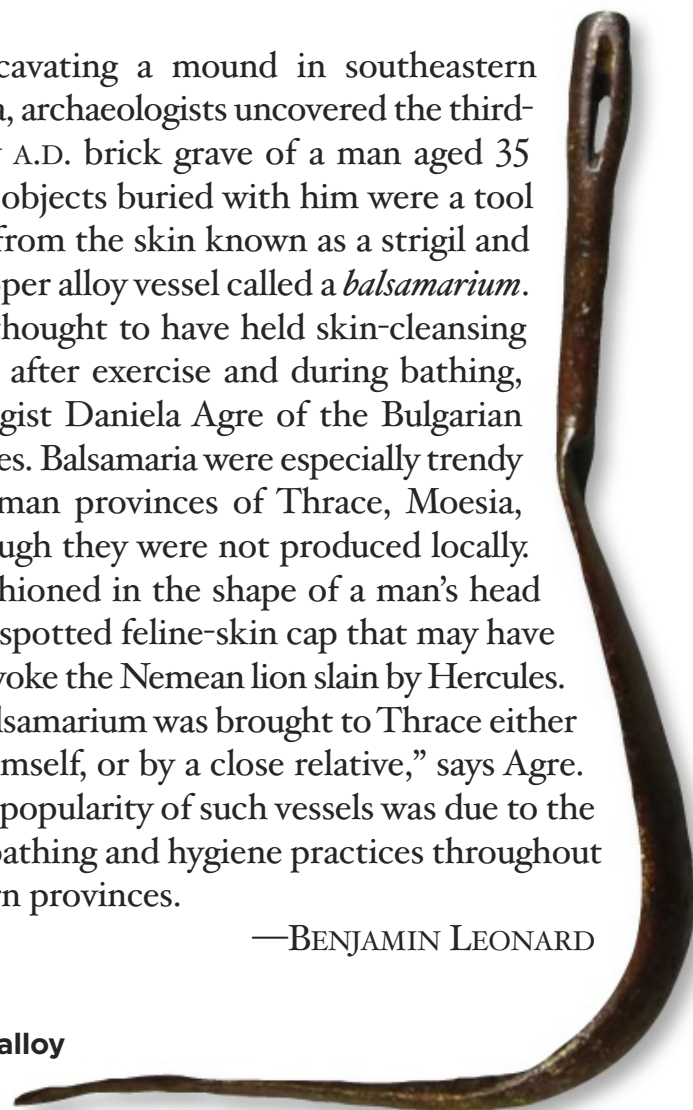
Brick grave, Bulgaria

BATH BUDDY

While excavating a mound in southeastern Bulgaria, archaeologists uncovered the third-century A.D. brick grave of a man aged 35 to 40. Among the objects buried with him were a tool used to scrape oil from the skin known as a strigil and a finely crafted copper alloy vessel called a *balsamarium*. This container is thought to have held skin-cleansing oils or balms used after exercise and during bathing, explains archaeologist Daniela Agre of the Bulgarian Academy of Sciences. Balsamaria were especially trendy in the eastern Roman provinces of Thrace, Moesia, and Pannonia, though they were not produced locally. The vessel was fashioned in the shape of a man's head covered in a tight, spotted feline-skin cap that may have been intended to evoke the Nemean lion slain by Hercules. "We believe the balsamarium was brought to Thrace either by the deceased himself, or by a close relative," says Agre. She notes that the popularity of such vessels was due to the spread of Roman bathing and hygiene practices throughout the empire's eastern provinces.

—BENJAMIN LEONARD

Copper alloy
strigil



Copper alloy
balsamarium
(two views)



MAYA MAIZE GOD'S BIRTH



Jade spoons and pendants,
Paso del Macho, Mexico

A cache of artifacts found beneath the central plaza at the site of Paso del Macho in the northern part of Mexico's Yucatan Peninsula may have been an offering made when the settlement was founded between 900 and 800 B.C. It contains some of the earliest evidence of Maya fertility rituals. Archaeologist Evan Parker of Tulane University, a leader of the ongoing excavation, which is conducted in cooperation with Millsaps College, says that more than 30 artifacts made of greenstone, including small stones that symbolize maize sprouting from the underworld, represent events in the story of the maize god's birth. This myth was a central part of Maya fertility and rainmaking rituals. The cache also contains several pots painted with images associated with fertility, along with spoons, clamshell pendants, and a large plaque.

—ZACH ZORICH



Jade
ax

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CRETAN COASTAL RITES

A monumental Minoan building surrounding a 110-foot-long courtyard has been uncovered at Sissi on the northern coast of Crete. Built around 1700 B.C. and featuring finely plastered floors, the structure is similar in size and grandeur to a number of palaces on the island dating to the same period. However, it lacks many typical features of these complexes, including storage rooms, administrative materials, and industrial areas. Archaeologists with the Belgian School at Athens, in collaboration with the Ephorate of Antiquities of Lassithi, did find a range of ritual paraphernalia at the site, offering a clue to what it was used for. “This building was really focused on its central court,” says excavation director Jan Driessen of the Catholic University of Louvain. “It’s quite clear that religious ceremonies took place there.”

Nearby, researchers unearthed the tomb of a woman dating to around 1400 B.C. that is typical of the Mycenaeans, who came from mainland Greece around the time she died. The woman was buried with an ivory-handled bronze mirror and a necklace of gold beads. Bone and bronze pins resting on her skeleton appear to have once held the woman’s clothing in

Aerial view, Sissi, Crete



Gold necklace

place. Hers is the first Mycenaean-style grave to have been found so far east on the island.

—DANIEL WEISS

STILL STANDING

Amid the ruins of two eighteenth-century farmsteads in a forest near Scotland’s Loch Ard, archaeologists have identified buildings that appear to be the remains of an illicit whisky distillery. (When in Scotland, be sure to leave out the “e” in

whiskey.) The buildings survive alongside the remnants of kilns for drying corn, which may have been used in the distilled spirits. A number of factors, including the site’s secluded location, its relative proximity to Glasgow, roughly 25 miles south, and its easy access to the loch’s waters, would have made it attractive to illegal whisky producers, says archaeologist Matt Ritchie of Forest and Land Scotland. In the late eighteenth and early nineteenth centuries, felonious distilling became common in the Scottish Highlands as stills making less than 100 gallons of whisky were banned, and high taxes were imposed on the malted grains used to produce the spirit.

—MARLEY BROWN



Ruined farmstead, Loch Ard Forest, Scotland

Terrestrial laser-scan images of farmsteads



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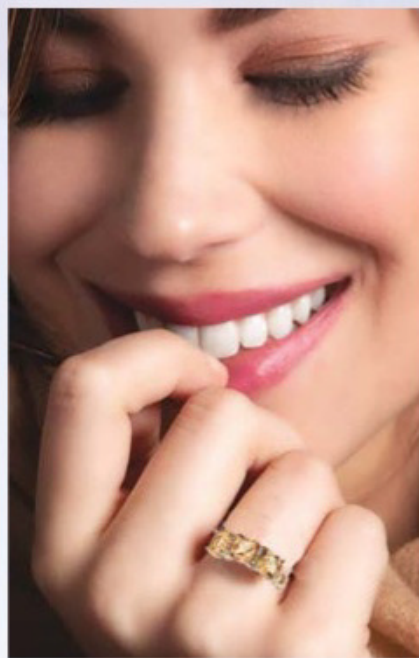
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DEERLY DEPARTED

While exploring a group of tombs in Haman in southeastern South Korea, archaeologists uncovered a fifth-century A.D. ceremonial earthenware vessel depicting a backward-looking deer, earthenware artifacts in the form of a house and a boat, and other goods. Researchers believe the deer vessel was used as part of a funeral ritual and then buried along with the deceased. A flame-stitch pattern covering the deer's leg is typical of earthenware from the Gaya Confederacy, an alliance of territories in southern Korea between the first and sixth centuries A.D. Archaeologists also found armor, helmets, and horse fittings that led them to believe the tombs belonged to Gaya leaders.

—HYUNG-EUN KIM



**Earthenware vessel,
Haman, South Korea**

THE TIME HAD COME, THE WALRUS SAID

Atlantic walruses



Viking settlers who arrived in Iceland around A.D. 870 may have hunted the island's native walrus population to extinction in less than 500 years. Radiocarbon dating of walrus skeletal remains excavated at multiple sites indicates that

the marine mammals lived continuously along Iceland's western coast for more than 7,000 years until dying out in the early fourteenth century. According to evolutionary genomicist Morten Tange Olsen of the University of Copenhagen, walruses were valued not only for their meat and blubber, but also, and perhaps primarily, for their tusks. "Given the extensive trade in walrus ivory from Norway and Russia that already existed in the ninth century, it seems plausible that settlers knew its value,"

—MARLEY BROWN

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SKOAL!

The *Orkneyinga Saga*, a thirteenth-century narrative history of the Norse earldoms of the Orkney Islands, in present-day Scotland, names Westness, a settlement along the coast of the island of Rousay, as the home of the chieftain Sigurd. Archaeologists working in the area have uncovered a Viking hall dating to sometime between the tenth and twelfth centuries at a farmstead called Skaill—the Norse word for “hall.” The stone building, which appears to be more than 40 feet long, is oriented down the sloping landscape toward the sea. Stone benches line the sides of its interior, where the team also found Norse artifacts such as steatite vessels, a bone spindle whorl, and a fragment of a carved bone comb. Skaill was likely the site of a dwelling of a chieftain or earl, says archaeologist Ingrid Mainland of the University of the Highlands



Bone comb fragment



Skaill, Rousay, Scotland

and Islands, though it’s unclear whether Sigurd himself raised a cup here.

—BENJAMIN LEONARD

MAYA TOTAL WAR

Scholars have long believed that, before A.D. 800, conflict between Maya centers was largely ritualized, limited to attacks on sacred sites and the taking of noble hostages. Thereafter, they believed, growing socioeconomic tensions led to all-out warfare between states. But when U.S. Geological Survey geographer David Wahl analyzed sediment cores taken from a lake just short of a mile from the ancient city of Witzna in northern Guatemala, he uncovered evidence that a massive fire had taken place there around A.D. 700. Archaeologists

then found that all major structures across the city, including the royal palace, had been destroyed by the conflagration. Stelas unearthed at Witzna record the city’s name, which was also mentioned in a hieroglyphic war statement on a stela at the nearby center of Naranjo. According to the statement, on May 21, A.D. 697, Naranjo subjected Witzna to *puluuy*, a term previously thought to refer to a local fire ritual. The evidence from the lake sediments and the destroyed buildings at Witzna shows that *puluuy* instead likely referred to an act of total war

that aimed to inflict great human cost on the enemy population. The Naranjo stela describes four other cities as having been subjected to *puluuy* as well, suggesting that early Maya military tacticians may have frequently waged total war against their enemies.

—ERIC A. POWELL



Replica of Maya mural, Mexico City



Stela, Witzna

To see 3-D models of stelas from the site of Witzna, go to archaeology.org/witzna.



Stone points

A SEASIDE JOURNEY TO AMERICA

Artifacts recovered from a 16,000-year-old site near the Columbia River in western Idaho are revealing that the first people to migrate to the Americas came from northeastern Asia. The site, called Cooper's Ferry, is one of only a few known to pre-date the Clovis culture—hunter-gatherers who lived across North America around 12,000 years ago and were, until recently, believed to have been the first settlers of the continent. Stone tools found at Cooper's Ferry belong to the Western Stemmed Tradition, a tool type that, according to research by an international team of scholars, resembles stone tools made by hunter-gatherers who lived in northeast Asia during the same period. This type of tool appears at Paleolithic sites along the Pacific coast of North America. The presence of the tools, combined with evidence that Cooper's Ferry was occupied roughly 1,000 years before the two continental ice sheets that covered North America had melted sufficiently to open an inland corridor, supports the theory that the earliest Americans probably followed a coastal route after crossing the Bering Strait into North America.

—ZACH ZORICH



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Stone head



Seal impression



Ceramic animal figurine



Stone animal figurine



Aerial view, En Esur, Israel

CITY LIMITS

Road construction in northern Israel has led to the excavation of a 5,000-year-old city called En Esur that would have been one of the region's largest settlements at a time when the world's first cities were taking shape. Thousands of volunteers overseen by Israel Antiquities Authority archaeologists have worked for more than two years to uncover 10 acres of the city and a wide array of artifacts. Archaeologist Yitzhak Paz estimates that only about a tenth of the city has thus far been excavated. En Esur may have been home to about 6,000 people living in a highly organized community with densely packed residences, grain silos, public buildings, burial caves, and a network of streets.

—ZACH ZORICH

WHERE'S THE BEEF?

Large amounts of animal bone found in a ditch on the outskirts of a Romano-British settlement near Ipplepen, in southwest England, might point to the operations of a third-century A.D. butchery. Most of the bone came from the feet and heads of cattle likely butchered on-site, which suggests the prime cuts of meat were sold and consumed elsewhere. Burned limestone thrown in with the bone could be evidence of the production of lime, which was often used to process hides to make leather. This, along with butchery marks on some bones that resulted from removing the hides, may indicate that tanners also worked at the site.



Cow jaws, Ipplepen, England

Despite Ipplepen's location on the western edge of the Roman Empire, explains University of Exeter archaeologist Stephen Rippon, imported tableware and amphoras, which contained olive oil and wine, unearthed at the site reveal that residents adopted at least some Roman dining and culinary practices. However, they continued living in roundhouses similar to those from the settlement's earliest occupation in the Iron Age, centuries before. Says Rippon, "It was as if they were picking and choosing which aspects of being Roman they liked."

—BENJAMIN LEONARD

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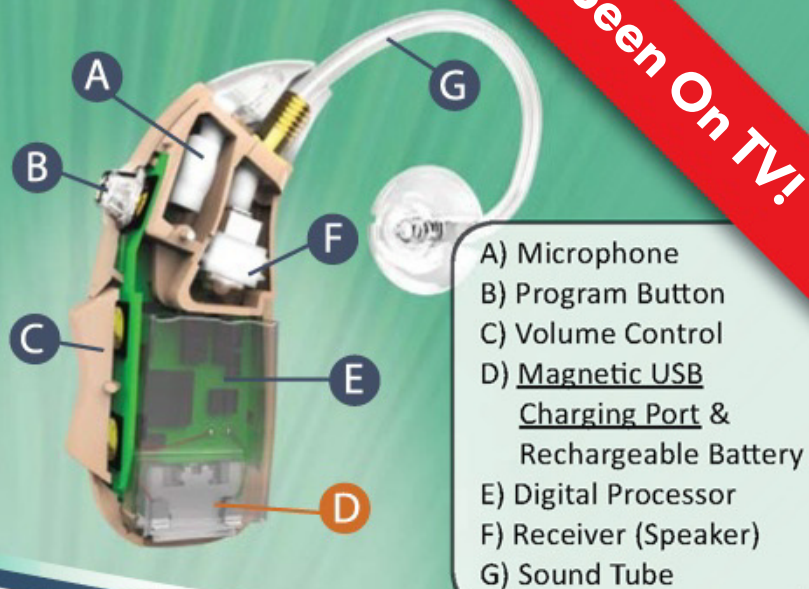
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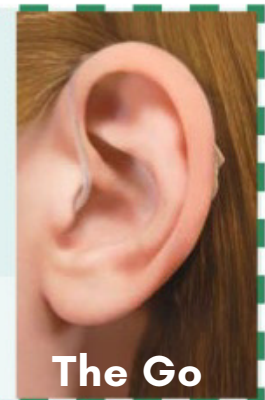


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SOUTH CAROLINA: After the Confederate submarine *Hunley* attacked USS *Housatonic* in Charleston Harbor in 1864, the sub sank mysteriously, killing all eight of its crew. Experts have long wondered why the vessel went down, and some now believe it may have been due to a disabled air circulation system. New research suggests that the system of snorkel tubes and rubber hoses that pumped fresh air into the vessel while it remained submerged had been dismantled, perhaps contributing to the sub's fate.



SCOTLAND: In the 18th and early 19th centuries, a well-traveled drover's road made the Wilkhouse Inn near Brora a hive of activity. Archaeologists have uncovered a trove of objects, including glass fragments, coins, and personal items left behind by the tavern's guests in its heyday. But not everyone was welcome at the inn. An inverted cross carved into a fireplace hearthstone was intended to deter witches from flying down the chimney.

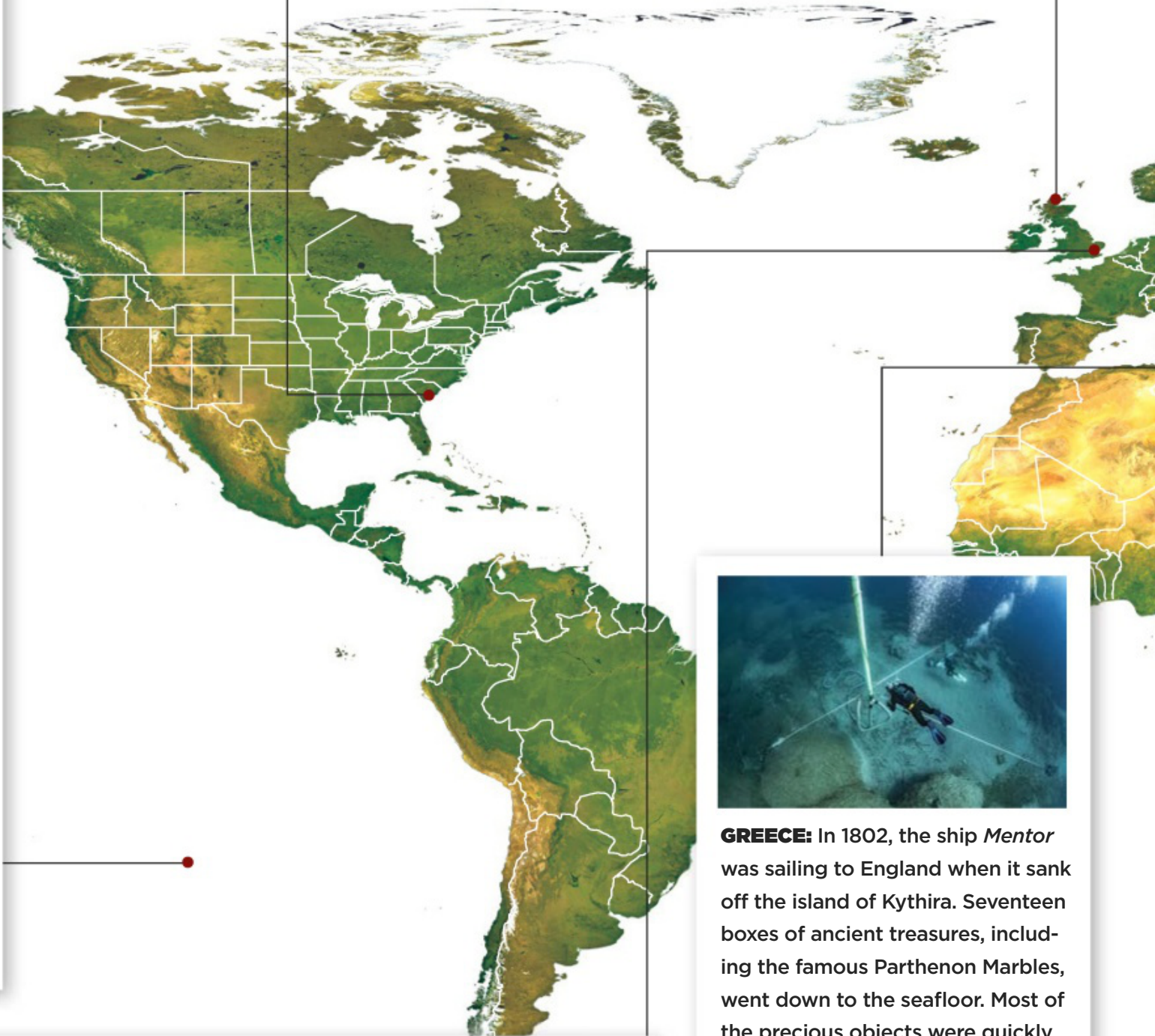


CHILE: The enormous carved heads known as *moai* are the most recognizable monuments created by the Polynesian civilization that settled Rapa Nui (Easter Island) around A.D. 1000. It turns out the sculptures were also instrumental in boosting agricultural productivity there. Analysis of soil samples taken near the island's main quarry indicates that quarrying activity caused phosphorous and other beneficial substances to enrich the adjacent slopes. This allowed the Rapa Nui settlers to grow sweet potatoes, bananas, and taro there, even when conditions were less favorable elsewhere on the island.

ENGLAND: Parts of a Shakespeare-era theater were unearthed under London's Whitechapel neighborhood. The Boar's Head Playhouse is known from historical documents, but its ruins were brought to light for the first time during a recent construction project. Originally an inn, the Boar's Head was converted to a theater in 1598. However, records show that open-air performances were held on the property as early as 1557, when a play titled *A Sack Full of News* was banned due to its lewdness.



GREECE: In 1802, the ship *Mentor* was sailing to England when it sank off the island of Kythira. Seventeen boxes of ancient treasures, including the famous Parthenon Marbles, went down to the seafloor. Most of the precious objects were quickly raised, but investigation of the wreck site has shown that many remained. Divers recently retrieved a gold ring, a pair of gold earrings, and three gaming pieces, as well as various other wood, ceramic, and bone artifacts.



RUSSIA: Between the 14th and 18th centuries, the Black Death killed as much as 60 percent of Europe's population. The bacterium that caused the plague has now been traced to the town of Laishevo, near the Volga

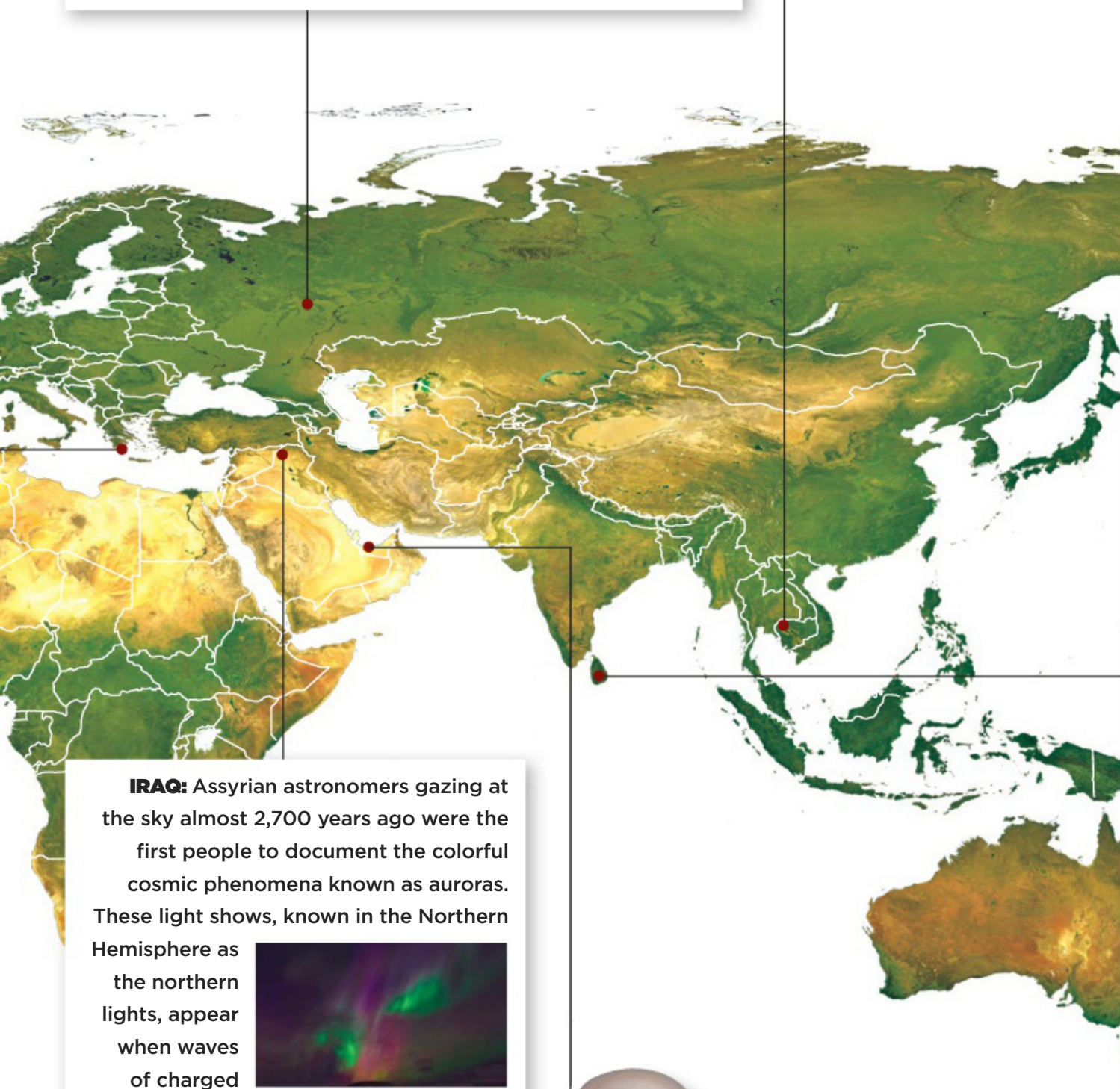


River. Scientists reconstructed the bacterium's genome by taking samples from the teeth of 34 victims buried at 10 different sites. They concluded that the sample from Laishevo was ancestral to the others, indicating that the plague must have originally struck there before spreading westward.

CAMBODIA: Workers searching through a pile of debris for fallen roof stones from the Ta Nei Temple in Angkor



unexpectedly unearthed the head of an ancient bodhisattva statue. The sculpture, which is around 2 feet tall and dates to the late 12th or early 13th century, has a small Buddha figure carved into the hair above its forehead. In Mahayana Buddhism, a bodhisattva is someone who is on the path of enlightenment to attain Buddhahood.



IRAQ: Assyrian astronomers gazing at the sky almost 2,700 years ago were the first people to document the colorful cosmic phenomena known as auroras. These light shows, known in the Northern Hemisphere as the northern lights, appear when waves of charged



particles from the sun collide with the earth's magnetic field. When a massive solar wave hit the earth in the early 7th century B.C., the effects were visible as far south as Mesopotamia. Three cuneiform tablets from Nineveh record this unusual event, documenting a strange "red glow," "red cloud," and "red sky."



SRI LANKA: It was much harder for early humans to fashion small, delicate stone tools such as arrowheads than it was to make large, substantial ones like axes. Yet, by around 45,000 years ago, a community living in the rain forests of Sri Lanka had mastered this technology. A collection of micro-liths found in the Fa-Hien Lena Cave is the oldest assemblage ever discovered in South Asia. These advanced tools allowed people to thrive in the area's difficult rainforest environment earlier than was once thought, by hunting small tree-dwelling animals.



UNITED ARAB EMIRATES: A wealth of biological material from two islands in the Persian Gulf demonstrates how well Neolithic communities exploited marine resources. For example, thousands of fish bones from the islands of Marawah and Dalma indicate that people living there 7,500 years ago used nets and traps made from date palms to catch a wide variety of fish. On Marawah, archaeologists also discovered the world's oldest known pearl, a rare item that would have been used as either jewelry or currency.

5th Dynasty Egyptian Tomb



ARCHAEOLOGY magazine reveals the
year's most exciting finds

TOP 10 DISCOVERIES OF 2019



OLD KINGDOM TOMB

Saqqara, Egypt

During investigation of the funerary complex of the 5th Dynasty pharaoh Djedkare Isesi (r. ca. 2381–2353 B.C.), a team from the Czech Institute of Egyptology discovered the painted tomb of a high-ranking Old Kingdom Egyptian dignitary. After descending a narrow subterranean tunnel that opened up into a series of rooms, members of the team, led by archaeologist Mohamed Megahed, found hieroglyphs on the walls announcing that a man named Khuwy was entombed within the chamber. The writing also enumerates Khuwy's many titles, including "Secretary of the King," "Companion of the Royal House," and "Overseer of the Tenants of the Great House."

Alongside the hieroglyphs are scenes painted in colors that remain vibrant even after 4,300 years. One of the main panels depicts Khuwy himself, seated



before a table piled high with food, drinks, and other offerings meant to sustain him in the afterlife. "Scenes of the tomb owner are highly unusual in Old Kingdom tombs," says Megahed. The high-quality paintings, the tomb's proximity to Djedkare's own pyramid, and its design—which mimics that of a tomb belonging to a 5th Dynasty pharaoh—all suggest that Khuwy played a prominent role in the royal court.

—JASON URBANUS



MAYA SUBTERRANEAN WORLD

Chichen Itza, Mexico

Archaeologists exploring a cave system near the center of the Maya city of Chichen Itza unexpectedly came upon several chambers filled with ritual objects. This discovery supports the theory that when the great city was founded, sometime before the seventh century A.D., it was laid out with a



Ceramic incense burners depicting Tlaloc

relationship to the sacred underground realm in mind. Dubbed Balamku, or “Cave of the Jaguar God,” the cave system was first recorded by an archaeologist in 1966 and then sealed off from the outside world.

The current team, led by archaeologists Guillermo de Anda of Mexico’s National Institute of Anthropology and History and James Brady of California State University, Los Angeles, reopened the long-overlooked cave during a survey of underground rivers. After crawling through its cramped passages, they identified at least seven ritual chambers holding some 170 ceramic artifacts in all, including incense burners decorated with depictions of the rain god Tlaloc. “Balamku helps show that the subterranean world was important to the ancient Maya in ways archaeologists still don’t fully appreciate,” says Brady. The team also found evidence that the cave was desecrated in antiquity, likely by the same people who attacked Chichen Itza around A.D. 1200, precipitating its collapse. Further study of the cave may provide a more precise date for the city’s fall.

—ERIC A. POWELL



Ceramic ritual artifacts



NEOLITHIC HENGE FEASTS

Wiltshire, England

Neolithic Britons not only traveled hundreds of miles to attend celebrations at sacred sites, they also brought their own pigs with them to be consumed in the festivities. The food that an animal or person eats when young leaves a chemical signature in their teeth and bones that scientists can analyze to determine where they were—or were not—raised. An investigation led by Richard Madgwick of Cardiff University recently analyzed pig bones discarded more than 4,000 years ago at four henge sites in southwest England, including Durrington Walls. Madgwick concluded that many of the pigs butchered at the henges were not bred nearby, but were instead brought from as far north as modern Scotland and northwest England. “This shows that there was a much more mobile, connected society than we once thought,” he says. “Knowledge of these events and monuments reached far and wide. People were clearly very organized and went to great lengths to adhere to the symbolic regulations these monuments required.” One such requirement may have been to contribute a pig that they themselves had raised. “People from across Britain would gather for these feasts and consume food from across Britain,” Madgwick says. “This is a potent act in constructing group identity.”

—JASON URBANUS

Durrington Walls



ON THE ORIGIN OF APPLES

Tuzusai, Kazakhstan

Researchers are now one step closer to understanding how apples made the journey from wild populations to grocery stores and farmers markets around the world, and how that process differed from the domestication of grasses such as wheat and rice. The first people to make use of these grasses encountered fields of densely packed wild cereals. The seeds of these self-pollinating annuals drop to the ground when ripe, allowing a fresh crop to grow each year. Over the course of millennia, beginning about 12,000 years ago, humans first harvested, and then domesticated, these crops. Apple trees, on the other hand, reproduce poorly when fallen apples are left to rot, or when second-generation trees grow too close to their parents. They rely on animals—including humans—to disperse their seeds and carry out pollination.

The fossil record suggests that apples developed across Europe and Asia as early as 11.6 million years ago. Apple specimens from a Neolithic site in Switzerland date back to 3160 B.C. Archaeologists have



Garden fresco, Prima Porta

discovered an apple seed from the end of the first millennium B.C. at a village site in the Tian Shan Mountains in Kazakhstan. This is thought to be where the modern apple originated. As part of a quest to determine how apples were domesticated, archaeobotanist Robert Spengler of the Max Planck Institute for the Science of Human History has combined the fossil and archaeological evidence with genetic studies comparing modern apples to their ancient ancestors. He has concluded that the first human populations to encounter wild apples took on a role once performed by now-extinct megafauna, dispersing seeds and pollen, and, inadvertently, expanding the fruit's range. Says Spengler, “It's clear that humans are enticed by the same food sources that would have enticed a mastodon.”

—MARLEY BROWN

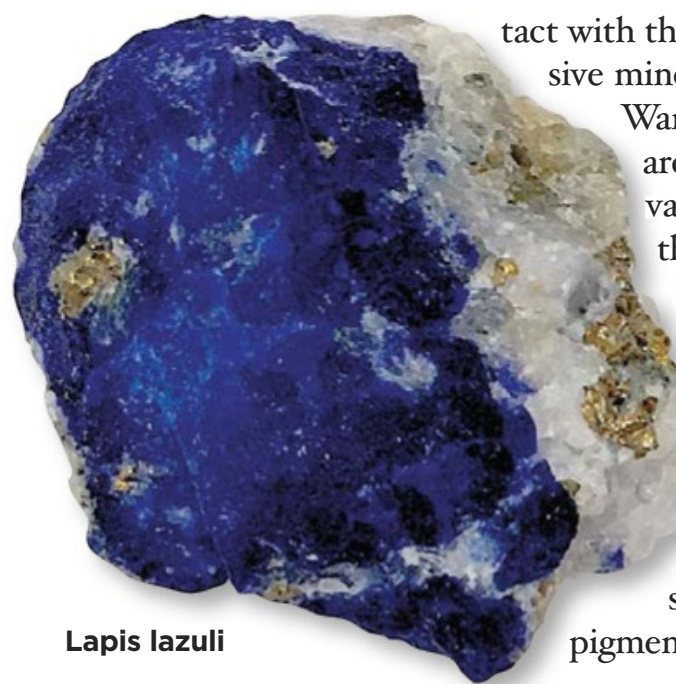


MEDIEVAL FEMALE SCRIBE

Dalheim, Germany

Ultramarine, a brilliant blue pigment, was so dearly coveted in the European Middle Ages that at times it fetched a higher price than gold. The coloring was prepared from the mineral lapis lazuli, which was mined at a single remote location in Afghanistan. A multidisciplinary team was, therefore, surprised to detect an abundance of ultramarine particles embedded in the dental plaque of a woman buried in the eleventh or early twelfth century at a German monastery. “We wondered how on earth a woman at this early date, in a kind of backwater location, came into contact with this incredibly expensive mineral,” says Christina Warinner, a molecular archaeologist at Harvard University and the Max Planck Institute for the Science of Human History.

The most likely explanation, the researchers concluded, was that the woman was a scribe who used the pigment to illustrate sacred



Lapis lazuli



Scribe's teeth

manuscripts. Their method of analysis may point the way to identifying more early medieval female scribes, who have gone unrecognized because they rarely, if ever, signed their work. “We do have a few surviving manuscripts written by women around the same time period,” says Warinner. “But how many more artists are out there waiting to be found if we just look at their teeth?”

—DANIEL WEISS



NEW GOLDEN HOUSE ROOM

Rome, Italy

A small crack in a vaulted ceiling led archaeologists to a new room of the Domus Aurea, or “Golden House,” the immense pleasure palace built by the emperor Nero after a fire devastated Rome in A.D. 64. After Nero’s death, the Domus Aurea was seen as the emperor’s folly, and the structure’s interior was completely filled in. A public park for all Romans to enjoy was built on top. It was not until the fifteenth century that, quite by accident, the vast property was rediscovered. Since then, the Domus Aurea has been the site of exploration, excavation—and nearly constant restoration. During one such restoration project, archaeologists found the new room, which is covered in frescoes. “It was very emotional for us to find a previously unknown room, or maybe one that we had lost track of,” says archaeologist Alessandro d’Alessio of the Italian Ministry of Cultural Heritage. The frescoes depict a centaur and other mythological figures, a whistle-like instrument, decorative plants, and a column topped with a golden bowl and sphinx that has given the space its name, the “Room of the Sphinxes.”

—MARCO MEROLA

Mythological fresco, Domus Aurea





Portrait of Hildegard of Bingen, 12th-century author



PERUVIAN MASS SACRIFICE

Pampa la Cruz, Peru

More than 230 children and nearly 400 llamas—along with evidence that suggests they were part of three distinct mass sacrificial events—have been discovered at the coastal site of Pampa la Cruz. The first of these events dates to around A.D. 1250, and is thus the earliest mass child and animal sacrifice in the region. Similar mass sacrifices have been found from later dates in the same area, and have been interpreted as offerings to the gods by the local Chimú people in response to the destruction wrought by El Niño events. But archaeologist Gabriel Prieto of the University of Florida believes the earliest Pampa la Cruz sacrifice may have had a political purpose. “It’s intriguing that this first sacrificial event occurred at exactly the time the Chimú were conquering people such as the Lambayeque, who lived in the valleys to the north,” says Prieto. “It’s fascinating to imagine that the victims may have been Lambayeque citizens brought here to celebrate those victories.”

Another possible interpretation is that the sacrifice was meant to honor Taycanamo, the legendary founder of the Chimú, who is said to have come from the sea and walked south to found the Chimú capital of Chan Chan around A.D. 1000. Pampa la Cruz overlooks the exact spot where he is thought to have landed.

—JARRETT A. LOBELL

Sacrificed child



Child's feather headdress





DENISOVANS AT ALTITUDE

Xiahe, China

Some 40 years ago, a Buddhist monk uncovered a mandible in Baishiya Karst Cave, more than 10,000 feet above sea level on the Tibetan Plateau. The specimen has now been dated to 160,000 years ago, and analysis of proteins from its teeth indicates that it belonged to a member of the hominin species known as Denisovans. These elusive ancient humans were previously known only through fragmentary remains of several indi-

Baishiya Karst Cave



viduals, all of which were found in southern Siberia's Denisova Cave, which is just 2,300 feet above sea level and almost 1,750 miles northwest of Baishiya Karst Cave. "This mandible reveals that Denisovans were geographically distributed much more widely and at higher altitude than we previously thought," says archaeologist Dongju Zhang of Lanzhou University.

Earlier studies of Denisovan genetic material had detected a mutation that fosters survival in low-oxygen environments found in extremely high-altitude locations such as the Tibetan Plateau. This same mutation has been identified in present-day Tibetans, and the discovery that Denisovans once inhabited the region may explain how they obtained this life-preserving adaptation.

—LYDIA PYNE

Denisovan mandible



Gilded silver dragon figures



TOMB OF THE SILVER DRAGONS

Arkhangai, Mongolia

In north-central Mongolia, archaeologists have unearthed two lavish tombs built for nobles of the Xiongnu Empire. A nomadic people who dominated the eastern Eurasian steppes from the third century B.C. to the first century A.D., the Xiongnu frequently waged war against

China's Han Dynasty (206 B.C.–

A.D. 220). To defend against

these incursions, the Han

built fortifications that even-

tually became part of the

Great Wall. Both of the

Xiongnu tombs, which were

excavated by a team from

Ulaanbaatar University and

the Henan Provincial Institute

of Cultural Heritage and Archaeol-

ogy, contained sumptuous grave goods. In the larger tomb,

researchers found wooden boxes that held silver rings,

jade belt hooks, and a pair of gilded silver dragons that

may once have served as handles on a vessel. The smaller

tomb contained the remains of a man buried with a horse-

drawn carriage, 15 horse heads, and 19 silver equestrian

ornaments, each depicting a unicorn deity. The team also

recovered part of a jade-decorated sword from this grave,

the first to be found in a Xiongnu tomb.

—ERIC A. POWELL



Unicorn equestrian ornament



NORMAN CONQUEST COIN HOARD

Chew Valley, England

On October 14, 1066, William the Conqueror (r. 1066–1087) defeated the last Anglo-Saxon king of England, Harold Godwinson (r. 1066), at the Battle of Hastings, ushering in Norman rule. According to British Museum researchers, the discovery in southwest England's Chew Valley of a cache of more than 2,500 silver pennies from the reigns of both kings underscores the political uncertainty of the years surrounding the Norman Conquest.

Most of the 1,236 coins in the hoard that feature Harold's face were minted in southeast England, which indicates steadfast allegiance to him in the region despite the coming threat of William's invasion. By contrast, all 1,310 coins featuring William were issued after his Christmas Day



Silver pennies depicting Harold (left) and William (right)

coronation, suggesting that by that point his claim to the throne was generally recognized. One coin minter seems to have taken advantage of the tumultuous period following Harold's death. Two "mule" coins, struck with Harold's visage on one side and William's on the other, represent this sneaky minter's attempt to avoid the expense of purchasing fresh dies to produce new coinage, as was required every few years. All together, the hoard's coins—some cut into quarters or halves to make smaller denominations—would have been more than sufficient to purchase at least 500 sheep.

—BENJAMIN LEONARD



Silver pennies

THE SHEER CLIFFS OF the small island of Okinoshima rise abruptly out of the sea some 40 miles off the coast of the Japanese island of Kyushu. Okinoshima's sole resident is a Shinto priest who serves as the caretaker of small wooden shrines built among huge boulders on its southern half. For followers of Shintoism, Japan's indigenous religion, Okinoshima is the sacred home of a trio of goddesses who, among their many responsibilities, ensure the safety of mariners. Fishing communities on the island of Oshima and in the nearby Munakata region on Kyushu still retain beliefs associated with the goddesses that originated perhaps some 2,000 years ago. Like mariners throughout Japan, the fishermen of Oshima may utter a prayer to the deities known as the Munakata goddesses before setting out to sea, and still perform yearly rituals honoring them. These traditions have distant origins in rituals practiced by people on Okinoshima as early as the fourth century A.D. During that time, the Japanese archipelago first came under the control of the Yamato Court, which was ruled by the ances-

The island of Okinoshima is home to three goddesses worshipped by followers of Shintoism, and was a destination for religious pilgrims in the first millennium A.D. Two gilt-bronze dragon heads (below) are among the 80,000 offerings archaeologists recovered from the island.

JAPAN'S SACRED ISLAND

For centuries, rituals performed on an isolated island played a key role in the emergence of Japan

By ERIC A. POWELL

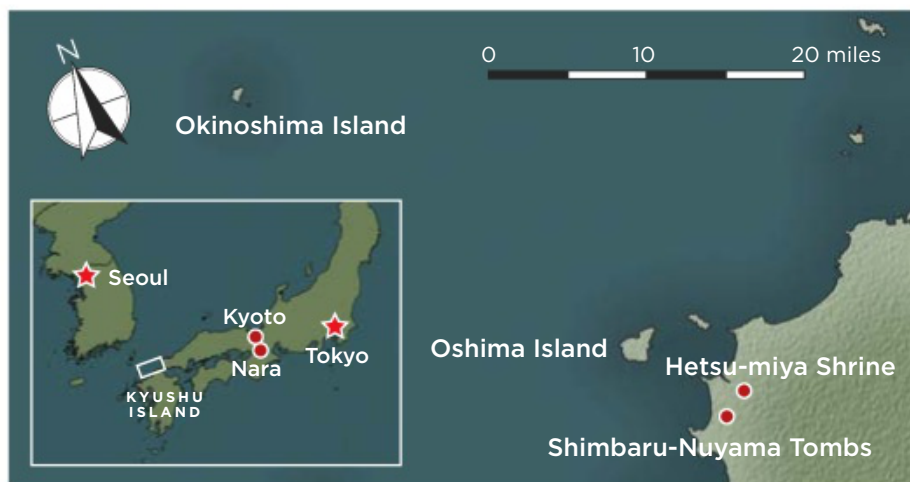




tors of today's Japanese imperial family, and contact with the kingdoms of Korea and the Chinese imperial state began to intensify. Goods, people, and ideas began to flow from mainland Asia to the Japanese archipelago. Thousands of artifacts unearthed on Okinoshima dating to this period show that the island played a central role in this essential relationship.

For much of the first millennium A.D., no long-distance fishing trip, diplomatic mission, or merchant venture from Japan to mainland Asia was complete without a stop at Okinoshima

to observe rituals honoring the Three Goddesses and seek their protection during the dangerous journey ahead. "At that time, if you were traveling to China or Korea, you needed to stop at Okinoshima," says Sainsbury Institute archaeologist Simon Kaner. "It wasn't an isolated, remote island at all, but lay on an important maritime route to the Korean Peninsula." Archaeologists are uncertain just how the rituals played out, but from about A.D. 400 to 900, they clearly involved leaving objects ranging from simple pottery to elegantly crafted bronze



dragon figures atop or near the massive rocks that stand close to today's Shinto shrines. During this period, as the Yamato noble house consolidated central authority in the Japanese archipelago, the practices of Shintoism first became codified. At the same time, cultural and political influence from Korea and China was at its peak and resulted in the introduction of both writing and Buddhism by the seventh century A.D.

Since then, Buddhism has been practiced in Japan alongside Shintoism, which can be translated as "way of the spirits." The religion involves the worship of thousands of different *kami*, or spirits, who are as diverse as gods, ancestors, and natural forces such as wind, or even islands, including Okinoshima itself. A Shinto institution known as the Munakata Grand Shrine currently oversees Okinoshima, as well as a shrine dedicated to the goddesses on Oshima and another, the Hetsu-miya Shrine, on Kyushu.

The traditions of Shintoism have evolved over the past 2,000 years, not least because the authority of the central state and local powers over religious matters has waxed and waned. In the mid-nineteenth century, when imperial power was consolidated after a long period of fragmentation, Shinto institutions came under central government control. But in the post-World War II period, so-called State Shinto was suspended and authority returned to individual shrines and other Shinto institutions, such as the Munakata Grand Shrine, which precipitated a revitalization of long-dormant religious practices. In the 1950s and 1970s—despite a strict taboo against taking artifacts from the island—the Munakata Grand Shrine priests allowed archaeologists

to excavate a few sites on Okinoshima in order to learn more about the rites practiced on the island in the distant past.

Over the course of two major excavation campaigns, archaeologists recovered some 80,000 artifacts, all of which were then stored on the grounds of Kyushu's Hetsu-miya Shrine, thus honoring the taboo against removing artifacts from sacred sites. The objects included Korean and Chinese luxury goods, as well as iron weapons, pottery, and bronze and stone figurines of local manufacture. "It's such a diverse collection of artifacts," says Kaner. He notes that the majority of the offerings found on Okinoshima date to a period before Shinto rituals were first codified in writing, giving scholars a very rare glimpse of how the precursors to Japan's indigenous religious system functioned in their earliest forms.

In recent years, Japanese archaeologists, as well as foreign scholars including Kaner, have refocused attention on this collection of artifacts in order to provide context for the effort to name Okinoshima and other sacred sites overseen by the Munakata Grand Shrine to the list of UNESCO World Heritage sites. As they have returned to the study of this massive artifact collection using modern methods of archaeological analysis, they have shown how these objects help tell the story of a 500-year period when, under the watchful eye of both central and local powers, foreign and local traditions combined to help forge the nation of Japan.

CHINESE HISTORIES DATING to the early first millennium A.D. refer to Japan as the semi-mythic Land of Wa, a place that was possibly haunted and certainly difficult to reach. One source states that in A.D. 238, Queen Himiko of Wa, who was likely fictitious, dispatched a mission to China



A Shinto shrine on Okinoshima stands near boulders where rituals honoring the Three Goddesses were practiced beginning in the fourth century A.D. Today, a single priest watches over the site.

that was sent home with 100 bronze mirrors. Archaeologists working at Okinoshima found many Chinese bronze mirrors lying atop the boulders near the shrine. Dating of the mirrors and other artifacts found there shows that many of the earliest rituals on Okinoshima were carried out on the summits of the boulders, some of which are 30 feet high. Fukuoka University archaeologist Junichi Takesue speculates that the bronze mirrors, which date to the fourth century A.D., may have been first taken as diplomatic gifts to the Yamato Court, which lay far to the east of the Munakata region. Perhaps after being presented at court, speculates Takesue, the mirrors were repurposed as offerings to the Three Goddesses on Okinoshima to ensure the good fortune of another diplomatic or trading mission.

Chinese histories aren't alone in recording early contact with the people of Wa. A stela located in the territory of the Goguryo Kingdom, in northern Korea, states that in A.D. 391, the Kingdom of Wa sent warriors to aid the Goguryo Kingdom in its war with neighboring Korean states. Korean pottery sherds dating to this era found on Okinoshima suggest the existence of a close relationship between the peninsula and the Munakata region. Among the artifacts left as offerings atop the boulders are iron ingots imported from Korea and seven iron swords made locally, as well as iron daggers and pieces of armor. That objects related to warfare feature prominently in the early offering caches on Okinoshima suggests to archaeologist Mamoru Saso of Kokugakuin University that they may



A bronze mirror (left) and comma-shaped stone beads (above) are among the votive objects dated to the fourth and fifth centuries A.D. found atop boulders on Okinoshima.

have been deposited on the island as part of rituals intended to seek divine support for the military expeditions mentioned in the Goguryo stela, and that the ruling Yamato nobles had an early hand in the rituals performed on Okinoshima. Other archaeologists, including Takesue, believe that a local clan of Munakata nobles played an important role in managing international affairs from an early period, and would have carried out rituals on Okinoshima on behalf of the Yamato Court. Whoever supervised the rites, maintaining relationships with the East Asian mainland was critical by the fourth century, and the rituals undertaken on Okinoshima were intended to symbolically protect those relationships. It is possible that ritual observances on Okinoshima were supervised by both the Munakata clan and the central court, and that authority over the island went back and forth between the two over the course of the 500 years during which the island was an important destination for those worshipping the Three Goddesses.

Other artifacts from the same time that bronze mirrors from China and iron ingots from Korea were being left as offerings atop the boulders have given archaeologists more insight into how the rituals were conducted. Simple pottery vessels recovered from the island dating to this period may have once held food. Fujio Oda, an emeritus professor of archaeology at Fukuoka University who participated in the original excavations at Okinoshima, notes that feeding the kami remains a critical element in Shinto observances today, and that it was likely a key part of these early rites as well. Oda also notes that near the remains of a stone altar atop one of the tallest Okinoshima boulders, his team recovered a series of comma-shaped jade beads. He now believes that the beads may have originally hung from a string that delineated the border of an altar where offerings were left, a subtle detail that speaks to how the earliest people to petition the Three Goddesses may have worshipped them.



Fragments of pottery still cover the ground where offerings were made on Okinoshima more than 1,000 years ago.

IN THE FIFTH AND SIXTH CENTURIES, the voyagers practicing rituals on Okinoshima changed how they honored the Three Goddesses. At this point, visitors to the island began

to leave their gifts not on top of the boulders but below them, in their shadows. Archaeologists are uncertain why visitors to Okinoshima changed the location of the rituals, but it is evident that an entirely new class of offerings was being left. According to Takesue, the sophistication and value of the gifts to the Three Goddesses increased dramatically. Some locally manufactured items, such as bronze mirrors and iron weapons, were left in the boulders' shadows, but Korean gold rings and gilt-bronze horse trappings were as well.

Later records indicate that in A.D. 571, a Japanese envoy was sent to the court of Korea's Silla Kingdom, then one of the most prominent states on the peninsula, and that 40 such missions followed. It is possible that the horse trappings and rings were acquired during these diplomatic trips. Saso, who has studied Okinoshima's metal artifacts, believes that the appearance of horse trappings in particular may relate to the development of a seasonal Shinto wind deity festival during which a divine horse is saddled with offerings for the gods.

The expense and high quality of these goods suggests to many of the scholars studying Okinoshima that the Yamato Court now played a direct role in maintaining the ritual sites on the island, with the local Munakata clan taking on a supporting role. Nevertheless, the clan was still quite powerful. During this period, large keyhole-shaped earthen tombs, similar to those constructed for the imperial Japanese family, were being built in the Munakata region to hold the honored dead of the clan. These burial mounds, known as the Shimbaru-Nuyama Tombs, stand clustered on a plateau looking out toward both Oshima and Okinoshima, next to land that was once the site of a pair of inlets where the clan's ships are thought to have docked, a clear statement that the sea was a place from which the clan drew its authority.

AS JAPAN'S CONTACT WITH the Korean kingdoms and China intensified, the Yamato Court moved to the city of Nara, which became the capital of a central-

A Korean gold ring (right) and gilt-bronze horse fittings (below), all found on Okinoshima, are evidence of the island's role in fostering connections between Japan and the Asian mainland.



A 5-stringed bronze zither is one of the many miniature objects visitors left on Okinoshima.

ized state organized around a complex bureaucracy similar to the one that existed in China. During this period, ritual practices on Okinoshima changed once again. Based on the location of artifact caches, it seems that rituals took place both in the shadow of the boulders and out in the open on a flat area of land some distance from the rocks. However, those leaving goods on Okinoshima still seem to have felt that only the best objects would do as gifts for the goddesses. Among the prestigious goods recovered that date to this period are a Chinese Tang Dynasty (A.D. 618–906) vase and gilt-bronze dragon heads. Visitors also left miniature objects made in imitation of larger ones. These included gilt-bronze musical instruments, such as a five-string zither, and a loom. This last item was perhaps an acknowledgment of the role the Three Goddesses played as the patron deities of silk weaving, which had been introduced from Korea and China around the time the island first became an important ritual site.

In the early seventh century, the Nara emperors commissioned the earliest histories of Japan, which describe myths that tie the Three Goddesses of Munakata to Amaterasu, the sun goddess and ancestor of the emperors of Japan. According to one legend recorded during this period, the goddesses were born when Amaterasu challenged her brother to a contest of honor. As part of the challenge, Amaterasu ate three pieces of her brother's broken sword and exhaled the pieces as fog, which transformed into the Three Goddesses. Recording such myths helped codify the Shinto traditions that lay behind rituals such as those practiced on Okinoshima.

These rituals began to lose their international character during the eighth century. Around this time, the Yamato Court stopped participating in wars on the Korean Peninsula, and enthusiasm for mainland Asian culture may have begun to diminish as well. Against the backdrop of these events, around A.D. 750, the location of the religious rites on Okinoshima changed once again. Whoever was now responsible for the rituals practiced them only in the open air, away from the imposing boulders. Although people continued to offer miniature bronzes to the goddesses, including bowls and jars, locally produced pottery and figures crafted from the mineral steatite depicting stylized figures that may have represented ancestors became more prominent among the offerings. The people visiting Okinoshima during this period seem to have been celebrating regional folk traditions rather than international connections. To archaeologists, this suggests that the Munakata clan was now asserting exclusive religious authority over Okinoshima.

Around A.D. 870, Korean pirates began to pose a serious threat to Japanese expeditions to mainland Asia. According



Boats traveling from Okinoshima to the large island of Kyushu during the annual Miare festival are part of a ritual intended to regenerate the divine power of the Three Goddesses, who ensure the safety of mariners.

to contemporaneous court records, imperial emissaries from the capital of Kyoto were dispatched to pray to the Munakata goddesses for safe voyages. But the long history of intense exchange between Japan and mainland Asia was nearing an end. By A.D. 894, a plan to send embassies to China was canceled. The Yamato Court then suspended the tradition of dispatching envoys to China altogether. Around this time, the practice of leaving ritual offerings to the Munakata goddesses also stopped. “This was a time when Japan was limiting contact with mainland Asia,” says Kaner. “To a certain extent, the country began to look more inward.” Instead of leaving votive offerings in the open air or near boulders, Shinto priests of this period began to worship inside wooden shrines on Okinoshima and Oshima, as well as inside the Hetsu-miya Shrine, an arrangement that has persisted to the present day.

THE WORSHIP OF THE Three Goddesses of Munakata is still widespread throughout Japan, but rituals dedicated to them continue to be especially important to the people who live within sight of Okinoshima. The largest and most important of these rituals is the Miare festival, dedicated to the annual rebirth of the goddesses, a version of which has been practiced for 800 years. After the abolition of State Shinto in the wake of World War II and the return of local authority, the Munakata Grand Shrine sought to revitalize

the Miare festival. Traditionally, it was a small affair involving Shinto priests and a small group of devotees, but, in the 1960s, the festival was combined with others to create a large event in which the entire community could participate.

The ritual’s set piece is a bamboo flagpole known as the Minagate being brought by boat from Okinoshima to the Hetsu-miya Shrine. Like the goddesses themselves, the Minagate has a mythic history. It is said that in the third century, an empress dispatched an old man to the Korean Peninsula carrying the Minagate. As he neared the coast, he swung the pole and parted the sea. An enemy army then advanced toward the ship, but the old man swung the Minagate again, and the seas swallowed the army. The old man then took the Minagate to Okinoshima in triumph, where he set it up as a marker on the spot where the goddesses are said to descend to Earth. Every October, a fleet of boats bedecked with colorful banners accompanies the Minagate as it is taken from Okinoshima to the shrine on Kyushu, where ceremonies regenerate the divine power of the goddesses. Like the changing rites once practiced on Okinoshima, this new festival combines rituals that are bound to a tradition that dates to a time when Japan was just beginning to emerge as a nation united by common beliefs. ■

Eric A. Powell is deputy editor at **ARCHAEOLOGY**.



Temple of the White Thunderbird

Excavators in southern Iraq have uncovered the long-lost home of the powerful Sumerian warrior god

By DANIEL WEISS



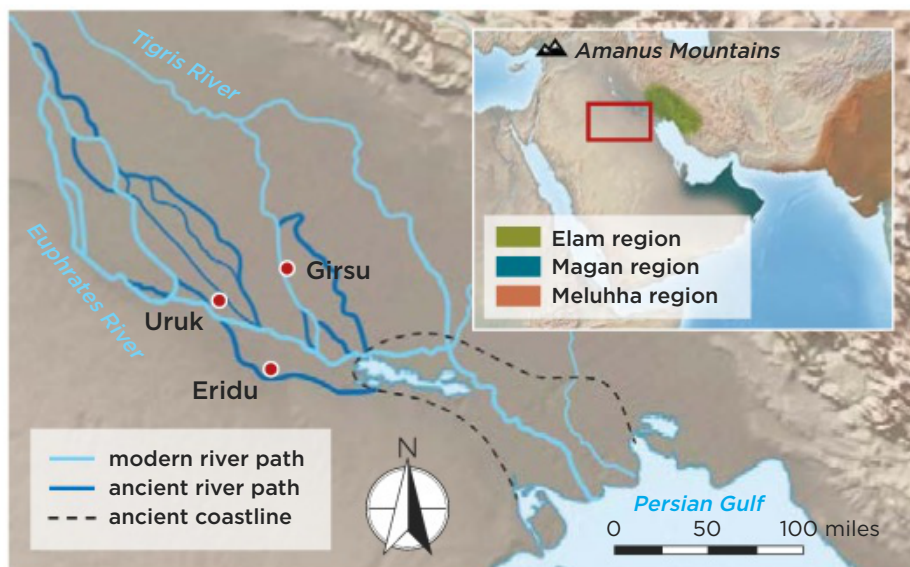
At the site of ancient Girsu, archaeologists have uncovered a temple called the Eninnu, built for the god Ningirsu by Girsu's ruler, Gudea. A stone mace head (left) found at the site depicts Ningirsu in the form of his avatar, the thunderbird.

MORE THAN 4,000 years ago, Gudea, the ruler of the Sumerian city of Girsu, had a dream. Before him, flanked by lions, appeared a man as large as the heavens and the earth, with the head of a god, the wings of a thunderbird, and a lower body in the form of a flood wave. The man uttered something about building a house. A woman consulted a tablet depicting heavenly stars. On a lapis lazuli plate, a warrior outlined the plans of a building. Birds in a poplar tree twittered away, and a stallion pawed at the ground.



Unsure what to make of his vision, Gudea traveled by canal to the temple of Nanshe, a goddess known to interpret dreams for other gods. She explained it to him thus: The man flanked by lions was Ningirsu, the chief god of Girsu, and he wanted Gudea to build his temple, called the Eninnu. The woman with the tablet was a goddess indicating that a bright star augured well for the endeavor. The warrior was a god laying out the temple's design. The noisy birds suggested the ruler would not be able to sleep until he had completed the project. And the stallion was Gudea himself, anxious to lay the first brick.

In a second dream, Ningirsu was more direct. "Laying the



foundations of my temple will bring immediate abundance,” the god told Gudea. “The great fields will grow rich for you, the levees and ditches will be full to the brim for you, the water will rise for you to heights never reached by the water before. Under you more oil than ever will be poured and more wool than ever will be weighed in Sumer.” Upon waking, Gudea mobilized his people to build Ningirsu’s temple.

IN 1877, ERNEST DE SARZEC, a French diplomat posted to Basra in the southeastern corner of present-day Iraq, then part of the Ottoman Empire, began excavating at a site known in modern Arabic as Tello. Over the next half century, de Sarzec and several successors unearthed thousands of inscribed clay tablets, multiple statues, and the remains of many buildings. They had discovered ancient Girsu, one of the major sacred cities of a previously unknown Mesopotamian civilization that had thrived in the third millennium B.C.

Many of the statues depicted Gudea (r. ca. 2150–2125 B.C.), typically with hands interlocked in a position of devout prayer. The inscriptions, written in wedge-shaped characters called cuneiform, turned out to be evidence of the oldest-known written language, Sumerian, which was developed at least as early as 3200 B.C. Girsu, along with the Sumerian centers of Uruk and Eridu, has come to be recognized as one of the world’s earliest cities, dating to around the same time. “In the 1870s, the Sumerian civilization had been completely forgotten,” says British Museum archaeologist Sebastien Rey, who has led excavations at Girsu since 2015. “This is really the cradle of civilization, so its rediscovery was a major breakthrough.”

Sumer consisted of a number of independent city-states that amassed tremendous agricultural wealth by channeling the waters of the Tigris and Euphrates Rivers into irrigation canals that they used to cultivate the countryside. Each city was seen as the

property of one of the gods in the Sumerian pantheon, and the city’s ruler was that god’s representative. Girsu, which was a major city in the city-state known as Lagash, belonged to Ningirsu, the heroic warrior god charged with combating demons and maintaining the cosmic order.

A number of the chaos-inciting demons that Ningirsu fought were believed to inhabit a mountain in the north-eastern reaches of the Sumerian world, in the region of present-day Turkey where the Tigris and Euphrates originate. “By defeating the demons in this mountain, Ningirsu tames the two rivers and makes irrigation possible on the flood plain,” says Rey. “Thus, he is considered a god of irrigation and agriculture, as well as the personification of floods.” One of the creatures Ningirsu was renowned for vanquishing was Imdugud, a thunderbird, or an eagle with the head of a lion. Rather than killing Imdugud, though, Ningirsu tamed it and adopted it as his avatar.

The most important and prominent structure in a Sumerian city was the temple to its main god. Rey says that the earliest tablets excavated at Girsu suggest that its original temple to Ningirsu predated the city itself, and served as a nucleus around which the urban center developed. Over the centuries, the temple was rebuilt multiple times, and, from the beginning, the tablets indicate, its name was “Eninnu, the White Thunderbird.” Eninnu, which means House Fifty, refers to the 50 divine powers of Enlil, the chief Sumerian god, who granted them to his son, Ningirsu. “When they say fifty powers, it’s equivalent to infinity,” says Rey. “You could translate it as the ‘almighty house’ or the ‘house of infinite powers.’” On the other hand, “White Thunderbird” identified the temple as the embodiment of Ningirsu.

In their excavations of Girsu, de Sarzec and his successors uncovered a series of Eninnu temples dating from around 2700 to 2200 B.C. in an area of the site they called the Mound of the Maison des Fruits. “These nineteenth- and early twentieth-century excavations were poorly recorded,” says Rey, “but based on what we can say from reconstructing the stratigraphy, there were at least four or five Eninnu temples built right on top of each other—all the way to just before the time of Gudea.” The French archaeologists didn’t reach the bottom of this deposit, and evidence of even earlier temples may remain undiscovered. They also never found Gudea’s Eninnu, which would become one of the most sought-after structures in all of Mesopotamia.



One of a pair of clay cylinders discovered at Girsu in the late 19th century. Together, they are inscribed with a lengthy poem recounting Gudea’s inspiration to build the Eninnu and the great efforts he undertook to complete the project.

DURING HIS FIRST YEAR OF EXCAVATIONS, de Sarzec discovered a pair of clay cylinders in a drain at Girsu. Each cylinder measures just under two feet tall and nine inches across, and together they are inscribed with a nearly 1,400-line poem, the longest-known Sumerian literary work. It describes the dreams in which Ningirsu visited Gudea, as well as the lengths to which the ruler went to build and consecrate the temple. “This is unique,” says Piotr Michalowski, an emeritus professor of ancient Near Eastern languages and civilizations at the University of Michigan. “We don’t have a text like this for any other Mesopotamian temple construction.”

One of the statues found by de Sarzec depicts Gudea as an architect with a building plan resting on his knees and is inscribed with an abridged description of the Eninnu’s construction. Inscriptions on many of the other known statues

wood; bitumen, gypsum, carnelian, diorite, and alabaster; and copper, silver, and gold. “All luxury goods in Mesopotamia had to come from afar because there was nothing there, just some low-quality limestone and shrubby trees,” says Michalowski. “Gudea’s reach was quite something if he was able to import all these things as he claimed.”

The cylinders relate that Gudea was a hands-on overseer, eagerly assisting various skilled laborers and personally stretching rope to obtain precise measurements. When it came time to lay the first brick, the ruler molded the clay himself with great ceremony. And when the brick proved to be “most beautiful,” all of Lagash spent the day in celebration. Among the temple’s features were a great dining hall, a room hung with weapons, a gem storehouse, a wine cellar, a brewery, a harp chamber, a chapel, and a courtyard that, the poem



Clockwise from above: A clay cone embedded in a wall of the Eninnu, a stone tablet deposited beneath a gate tower, and a clay cone after excavation. The tablet and the cones bear identical inscriptions stating that Gudea built the Eninnu for Ningirsu.

of the ruler, even those dedicated to gods other than Ningirsu, go out of their way to boast that he built the Eninnu. “Gudea was clearly obsessed with this temple, and it seems to have been the crowning event of his reign,” says Michalowski. “The amount of manpower, resources, and treasure that it required, as well as the level of social engagement, was quite enormous.”

To prepare for the temple’s construction, the cylinder and statue inscriptions recount, Gudea purified the city, banishing the ritually unclean or unpleasant-looking and forbidding debt collection and burial of bodies. From locales such as Elam and Susa in Iran, Magan in Oman, the Amanus Mountains in Turkey, and Meluhha, likely in the Indus Valley, he procured an impressive array of valuable materials: cedar, ebony, and fir

recounts, resounded with prayer and kettledrums. The finished structure was at once magnificent and ferocious, according to the cylinders’ inscriptions, which read: “The House, being a great mountain, bordered on heaven, being the sun, it filled mid-heaven with light, being Eninnu, the White Thunderbird, it [attacked] the mountain with spread wings.”

When Gudea introduced Ningirsu to the temple, the ruler commanded the entire population to kneel down and prostrate themselves. The god entered the complex as “a storm roaring toward battle” and emerged “like the sun god rising above Lagash.” As a reward for his efforts, Gudea was showered with acclaim, and his land grew ever more abundant.

FOR MORE THAN 80 YEARS after the French excavations ended in 1933, the location of Gudea's Eninnu remained unknown. But Rey, who is director of the Tello/Girsu Archaeological Project, suspected it could be found in an area of the site the French excavators called the Mound of the Palais, about 275 yards from the earlier Eninnu temples they had discovered. (See "Gudea's Big Move" on page 45.) At this location, de Sarzec had unearthed around a dozen statues of Gudea, including the one depicting him as an architect. The statues were found in the courtyard of a building dating to the third century B.C.—some 2,000 years after the time of Gudea. Bricks stamped with Greek and Aramaic inscriptions made clear the building had been constructed by a Babylonian named Adad-nadin-ahhe. Scholars long surmised that Adad-nadin-ahhe had been a local prince with a taste for antiquities who had collected the ancient statues as relics and displayed them in his palace.

Rey suspected, however, that the building had had a very different function and meaning. Its plan didn't seem to resemble a palace, he reasoned. Furthermore, the French excavations had found ritual deposits beneath the foundation walls, suggesting the building had once had a sacred purpose. When Rey's team investigated the building site, they found more of these deposits—fired-brick boxes holding votive objects dedicated to Ningirsu. This mimicked Sumerian ritual practices meant to mark the boundary between sacred and profane spaces. Adad-nadin-ahhe had carefully created a memorial shrine to venerate Gudea as an honored ancestor. "The statues of Gudea would have been placed in small niches where they would have received offerings," says Rey.

In the early 1930s, the French archaeologists reused the mudbricks from Adad-nadin-ahhe's building to construct a dig house. In the process, they noted that the bricks bore Sumerian inscriptions



This carved-shell amulet, which may depict the Sumerian demon Pazuzu, was discovered during excavations of the Eninnu. Pazuzu was a "good" demon who safeguarded pregnant women and newborn children.

tions describing Gudea's rebuilding of the Eninnu. For Rey, this was the final clue to the long-sought location of Gudea's masterwork. "The idea I had was that if Adad-nadin-ahhe had built a memorial shrine using bricks with Sumerian inscriptions from Gudea's temple," says Rey, "he must have built his shrine directly on top of the temple."

In the first trench that Rey's team opened at the Mound of the Palais in 2016, they soon uncovered massive, well-preserved mudbrick walls measuring up to 13 feet thick, along with pottery and other objects dating to the late third millennium B.C. Several weeks later, as they revealed more such walls, they found a five-inch-long clay cone placed in one of them. These cones are very common in Mesopotamia, and, like most of them, this one contained a dedicatory inscription. When the cone was removed from the wall, it was found to read: "For Ningirsu, mighty hero of Enlil, Gudea, ruler of Lagash, made everything function as it should, and built for him his Eninnu, the White Thunderbird, and restored it to its proper place." At long last, Gudea's temple had been found.

DURING THREE FULL SEASONS of excavating Gudea's Eninnu, Rey's team has discovered a vast range of artifacts. Among these are a white cylinder seal—a

Ernest de Sarzec, who excavated at Girsu starting in 1877, poses among the remains of a building constructed in the 3rd century B.C. on the site where Gudea's Eninnu once stood.



Héliog. Dujardin

H. de Sevelinges phot.



Viewed from outside the Eninnu, a monumental gate leads to the structure's most sacred area, the cella. There, archaeologists have uncovered the podium upon which a statue of Ningirsu would have rested and an offering table with traces of burning.

mark of individual identity that could be used to roll out a sort of signature on a tablet—that belonged to the god Ningirsu himself. “Since the god is the owner of the state, he would have had a cylinder seal just like a king or a merchant,” says Rey. The seal, carved from a shell brought from the Persian Gulf, depicts Ningirsu in his human form, wearing a horned tiara and standing in his temple, which is surrounded by bearded guards. They also found a ceramic head of a roaring lion as well as a carved shell amulet that may depict Pazuzu, a “good” demon who protected pregnant women and newborn children from the depredations of bad demons.

The excavations have uncovered evidence that Girsu was connected to the far-reaching trade networks that would have been necessary to provide the materials included on the Gudea cylinders. From Afghanistan, there is lapis lazuli, a blue mineral used for cylinder seals, beads, pendants, amulets, and eyes in votive statues made of alabaster. From the Indus Valley, there are precious stones such as carnelian, which was used in decorative panels and inlays, and from Iran, hard stones such as green steatite for statues and mace heads. The previously discovered statues of Gudea are made of diorite, a hard black to dark-green stone from Oman. Of particular interest are fragments of unusual vessels carved from fine honey-colored

limestone imported from eastern Iran that was polished until almost translucent, resembling alabaster. The vessels were inscribed with Gudea’s name and had traces of deliberate abrasion around their rims. This suggests they were once encircled by metal bands that were also likely inscribed. In addition, a weight of the sort used by Indus Valley merchants was found in a surface survey near the temple. “That single find proves that Girsu was plugged into the Persian Gulf trade network,” says St. John Simpson, deputy director of the British Museum’s Iraq Scheme, which oversees the Girsu excavations. “It also suggests the presence of a little Indus Valley merchant colony sitting somewhere in the city in the shadow of the temple.”

Rey estimates that the entire Eninnu complex covers more than 40,000 square feet. By a stroke of luck, the first walls the team unearthed were very close to the temple’s most sacred section—the cella, or inner sanctum. There, the researchers excavated the podium on which the Sumerian high priests would have placed a statue of Ningirsu. In front of the podium, they found an offering table with traces of burning, most likely from incense. A statue of Gudea, almost certainly the one with the building plan and description of the Eninnu’s construction, would have faced the podium as well. There were also a large number of clay bowls and cups that the priests would have

used to carry offerings of food and beer to Ningirsu. “There would have been a daily ritual of waking the god, clothing him, feeding him, and basically looking after him throughout the day,” says archaeologist Ashley Pooley, a supervisor of the excavation. “Then they would put him to bed at night and close up the temple.”

The cella’s layout ensured that visitors did not directly face the statue of Ningirsu when entering. “The statue is considered to be imbued with energy, what the Sumerian texts call ‘radiance,’” says Rey. “It was so intensely powerful that it would burn your eyes, like looking at the sun for too long.” The temple was not seen as an inert structure, but as an entity that performed the functions of the god—it *was* the White Thunderbird. This explains, for Rey, why its walls were so thick, far thicker than would have been necessary for structural reasons. “It’s like a nuclear reactor,” he says, “which has extremely thick walls to contain the extremely powerful energy inside.”

Entry to the temple was limited to those in the religious hierarchy. Several times each year, however, during festivals held in honor of Ningirsu, the energy of the Eninnu spilled beyond its confines and swept up the general populace. These festivals are believed to have lasted three or four days, and to have consisted of a procession in which the god’s statue was paraded in a sacred chariot from the Eninnu, out of the city, into the countryside, and then back to the holy precinct, where

A ceramic lion head is one of the many artifacts discovered during excavation of the Eninnu.



a religious feast was held.

Rey has found evidence of one of these feasts dating to the mid-third millennium B.C., and similar rituals are believed to have continued during Gudea’s reign several centuries later. Near thick layers of ash left behind by ritual fires, Rey excavated an eight-foot-deep pit containing more than 250 broken ceremonial goblets, along with the bones of sheep and other animals thought to have been sacrificed during the feast. “Looking at these orderly heaps of broken ceremonial beer mugs, you feel so close to these people who lived more than 4,000 years ago,” says Pooley. “Though rather tipsy from all the beer they’d been drinking, they seem to have queued up in a very orderly manner and chucked their ceremonial mugs into the pit. The larger population is mute to us because they didn’t write anything down, but there in that section you see them acting as a mass, and I find that quite amazing.”

EVER SINCE DE SARZEC discovered the building plan on the lap of the statue of Gudea in the late nineteenth century, scholars have debated whether it represents a generic temple layout or the actual footprint of Gudea’s Eninnu. After decoding the plan’s scale, which is laid out in a number of sets of evenly spaced lines at the front of the



A statue of Gudea (left) discovered at Girsu in the late 19th century features an inscribed building plan. Here (right), a diagram of this plan (in blue) overlays the current excavation. This demonstrates that the ancient statue’s plan accurately portrays the temple’s layout.

Gudea's Big Move

When Gudea rebuilt the Eninnu temple to the god Ningirsu at a new location in Girsu, he defied a long-standing Sumerian tradition of constructing temple after temple to a given god at the same spot. British Museum archaeologist Sebastien Rey and his team believe that the Mound of the Palais, where Gudea built his Eninnu, was originally the site of a temple to Ningirsu's wife, the goddess Bau. Further, the researchers think that the new Eninnu temple contained a shrine to Bau. Gudea's decision, they suggest, mirrored his own trajectory. He had married into a powerful family and obtained his position by connection with his father-in-law, Ur-Bau, who preceded him as ruler of Girsu. "There is a parallel between myth and Gudea's personal circumstances," says archaeologist Ashley Pooley, a supervisor of the excavations at Girsu. "He moved the temple for political reasons, to bolster his legitimacy."

The description of the Eninnu's construction inscribed



on a pair of cylinders discovered at Girsu provides ample evidence that the temple included a shrine to Bau, referred to as "Bau's inner room." When Gudea introduces Ningirsu to the temple, he welcomes the god's wife as well, saying, "My Bau, I erected your women's quarters for you, move in in comfort." Below the remains of the Eninnu, Rey's team has unearthed two superimposed monumental step platforms, the older of which is made of red mudbrick, and dates to the very beginning of the third millennium B.C. "Though we can't prove it yet," says Rey, "we believe these cultic platforms belonged to Bau's old temple."

Rey also believes he knows where Bau's shrine is located and plans to search for it. Preliminary investigation indicated that the spot was undisturbed by the French excavations of the late nineteenth and early twentieth century. "If we do

find this shrine of the goddess Bau," says Rey, "it should be basically intact."—D.W.

tablet, Rey and his team compared the plan with the results of their first two excavation seasons. "We projected the plan carved on the statue on top of the temple walls that we had excavated," Rey says. "And it fit perfectly."

This offered an opportunity to use the statue plan as a guide to further excavation. In autumn 2018, at the beginning of the team's third season excavating the Eninnu, they targeted a spot where the plan indicated a temple gate should be located. "After a couple of weeks of excavation, we found the foundations of a gate exactly where we had predicted they would be," says Rey. "It's as if we had a treasure map."

According to this map, the temple complex had six gates in all. In addition to the one identified using the statue plan, the team has excavated the gate that led to the temple's inner sanctum. This gate was flanked by two towers, and beneath one of them, archaeologists unearthed a deposit commemorating the beginning of the temple's construction. The deposit contained a white stone tablet bearing a dedication attesting that Gudea had built the Eninnu for Ningirsu. This inscription was identical to the one Rey had found on the clay cone in the temple wall. The same text was inscribed on a large stone door socket at the threshold of the temple's inner sanctum, and on the fine limestone vessels imported from eastern Iran. This message is repeated over and over again, to insist on the legacy of the king, the

importance of the god, and the name of the temple, says Rey. "It's like a mantra."

By the end of the team's third season, they had found 17 identical inscribed cones embedded in the temple's walls. The inscriptions wrap around the cones, and more than half of them were oriented so that Ningirsu's name faced the heavens. A smaller number had Gudea's name pointing up, and still others gave the temple's name pride of place. The researchers studied the overall arrangement of the cones and found that while they did not adhere to any geometric pattern, they might have been intended to represent a constellation. They are currently working to re-create the star map above Girsu at the time of Gudea to test this notion. "From the Sumerian texts, we know that the stars were extremely important in their religious rituals," says Rey. One example of this is the goddess Nanshe's interpretation of the dream that inspired Gudea to build the Eninnu, in which she suggested that a bright star foretold that the project would be a success. Perhaps through the cones' arrangement, Gudea was calling on the stars to help his dream project flourish once he had labored to make it a reality. ■

Daniel Weiss is a senior editor at ARCHAEOLOGY.

To read about a structure at Girsu identified as one of the world's oldest bridges, go to archaeology.org/bridge.

Friend? Roman? Countryman?

A rare Iron Age burial in southern England reflects the close connections between Britain and Gaul two millennia ago

by MARLEY BROWN

A field in North Bersted, West Sussex, was crisscrossed with a multitude of trenches, but when Chichester District Council archaeologist James Kenny arrived, excavators led him directly to the corner of a large area where they were at work uncovering a burial that dated to some 2,000 years ago. “This was the first burial of an Iron Age warrior I’d seen,” he says, “but I immediately knew what it was, even though it was one of maybe a small handful ever found in this part of the country.” In the course of the months-long project, which took place just over a decade ago, a team from Thames Valley Archaeological Services discovered that the grave was laden with artifacts, including a bronze helmet, a bronze shield boss, elaborate bronze latticework sheets that may have adorned a headdress, a bronze spear, and an iron sword. Given the paucity of elaborate Iron Age warrior burials known in Britain, the team consulted with French experts on the period who determined that many of the objects in the burial were unlikely to have been produced locally. “On the basis of circumstantial evidence, one would say it’s most likely this individual came from somewhere in Gaul, perhaps the region that is now Belgium,” Kenny says. “But he’s buried in a field in Britain. So, why?”

After spending much of the last decade in storage, the artifacts from the North Bersted burial will soon be displayed at Chichester’s Novium Museum. This has prompted a return to Kenny’s question, and what an answer might suggest about the movement of peoples around northern Europe during the Iron Age. Radiocarbon dates from a fragment of the warrior’s left femur place the burial around 50 B.C., roughly the time of Julius Caesar’s campaigns in

Gaul and arrival in Britain. In Caesar’s own account, he recalls that in Britain he encountered a heterogeneous mix of cultures whose languages, physical appearance, and material objects varied considerably. “It is tempting to imagine that this warrior was a patriotic Gaul evading Roman justice and rushing to the aid of his British cousins,” says archaeologist Richard Hingley of Durham University, “but the reality is likely to have been much more complicated.” Hingley explains that Iron Age peoples did band together to fight the Romans, but that the people known as Celts were not a united entity. “The Roman military included lots of so-called Celts who fought for them—and sometimes rebelled against them—and ‘Celtic’ opponents who sometimes sold out and cooperated,” he says. Hingley suggests that the warrior may have been a veteran who fought alongside Caesar in Gaul and Britain before settling locally. Or, he may simply have been from one of the groups that Caesar and the Roman historian Tacitus record as having maintained kinship ties on both sides of the English Channel.

Whoever he was, the warrior seems to have inspired great respect in the people who buried him. His sword and spear were deliberately destroyed before being interred alongside him. The spear was broken with the point placed at one end of the grave and the butt at the other end, and the sword was bent in half. “This material is presumably fabulously valuable at the time,” says Kenny, “and they made a point of rendering it unserviceable so it couldn’t be used by anyone else.” The discovery of more burials like this one, Kenny suggests, may one day help researchers figure out why these costly rites were observed, and, potentially, whether they were common to both Gaul and Britain. ■

Marley Brown is associate editor at *ARCHAEOLOGY*.





Artifacts uncovered from the mid-first century B.C. burial of an Iron Age warrior discovered in southern England include (clockwise from above) bronze laticework and the helmet it may have been affixed to, a bronze shield boss, and a bent iron sword.

INCA POWER POLITICS

Ruins of a half-built Andean capital are evidence of how the Inca controlled their vast empire—until the Spanish arrived

by ROGER ATWOOD

THE ABANDONED INCA CITY of Huanuco Pampa sprawls across a bleak plateau in the Andes some 12,000 feet above sea level. Its miles of stone ruins, remains of structures built by the Inca at the height of their empire, rise above waves of overgrown golden ichu grass. Huanuco Pampa is “the most completely preserved of the cities built by the Inca,” wrote the late Craig Morris of the American Museum of Natural History, who excavated the site for more than 20 years beginning in 1964. It may lack the sublime setting of Machu Picchu or the imperial grandeur of the Inca capital at Cuzco, but Huanuco Pampa bears witness like no other site to the twin conquests that convulsed the central Andes within less than a century—the Inca state’s subjugation of the region’s warring tribes in the mid-1400s, and the invasion of the Spanish conquistadores in the 1530s.

The Inca were the last of a long succession of pre-Hispanic civilizations that extended their power and their culture throughout the Andes and along Peru’s Pacific coast. They left no written records of their history. Thus, to tell the story of their rise from a pastoral tribe based near Cuzco to a formidable people who established the largest empire in the pre-Columbian Americas, historians have relied largely on Spaniards’ accounts of testimonies given to them by Inca elders in the sixteenth century. These texts are secondhand and colored by the Spaniards’ own assumptions about the Indians. They nevertheless reveal how the Inca folded the inhabitants of conquered regions into their empire through a combination of military aggression, reciprocal trading relationships, and marriages between their own elite and the leaders of other ethnic groups. Civilizations across the Andes fell under Inca rule, and while some accepted the new order, others chafed. In the rugged highlands around Huanuco Pampa, the Inca strove to bring local peoples under their dominion, but never completely subdued them.

Huanuco Pampa features often in the prolific chronicles of conquest left by the Spaniards, who seem to have been fascinated by the site, even as they found it inhospitable and did not settle there permanently. At nearly every other major

Inca settlement in Peru, the Spaniards built their churches and red-tiled houses on top of Inca foundations, but they found Huanuco Pampa too cold and too remote, and, after a half-hearted attempt at occupation, abandoned the city in 1541. It has stood almost completely uninhabited ever since.

Few sites demonstrate so vividly how the Inca used urban planning, public ritual, and even storage of massive amounts of food to win the allegiance of conquered subjects. At Huanuco Pampa, people of now-forgotten cultures such as the Chupaychu and the Huamalíes, who had been either crushed or co-opted by the Inca, were made to feel part of the Inca system, which was based on a complex mix of obedience to the lords of Cuzco, worship of the Inca sun god, Inti, and strict social hierarchy.

Perhaps as many as 30,000 people lived in Huanuco Pampa and its surrounding areas at the time of the Spanish conquest, wrote the conquistador and author Pedro Cieza de León in a 1553 book called *Chronicles of Peru*. According to Morris, in its heyday, 15,000 people may have lived in the city itself. But Morris also noted that many buildings were unfinished and that a few stone carvings of animals that adorned some structures were only half-completed. The Inca, he believed, were still expanding Huanuco Pampa when their society collapsed in the face of the Spanish onslaught. Many sites in Peru have half-finished Inca buildings, points out Luis Felipe Mejía, head of archaeology at the Peruvian government’s Ministry of Culture. Yet only Huanuco Pampa shows the collision of the rapidly expanding Inca Empire with the Spanish invasion so clearly, and on such a large scale. “What makes Huanuco Pampa different is that it was an important administrative center with monumental architecture at the intersection of major Inca roads,” says Mejía. “It was a major site that crashed, and nothing replaced it.”

HUANUCO PAMPA IS BISECTED by the main Inca Road, the source and sustenance of the city’s importance. The Inca built this winding 15,000-mile, north-south road, which anchored their far-flung transportation network, along the spine of the Andes, from modern-day Ecuador to

The Inca Road climbs a mountainside high in the Andes on the approach to Huanuco Pampa, which was once a major Inca center.



Argentina, with wide flagstones, terraces to control erosion, and an iron will to tame the forbidding Andean landscape and turn it to their advantage. This main Inca Road, much of which is intact today, was once the central artery of Inca commerce and conquest, the route along which the state moved its armies to distant corners of the empire and used llamas to transport prestige goods including salt, tropical bird feathers, and precious stones and shells. As the road approaches Huanuco Pampa, it descends a mountain pass on steps embedded in the slope and then crosses a pond via an earthen causeway rather than simply going around it, an example of how the Inca often seem to have built just to impress. Spectacular views open up at every turn. To the city's recently conquered peoples, the road would have served as a reminder of Inca might and engineering prowess, as well as a link to the home of their masters in Cuzco.

The archaeological record at Huanuco Pampa shows how the city became an outpost of Inca urban culture grafted onto an isolated farming region of llamas and potato plots. Even its name refers to pastoral life. *Huanuco* is an alternate spelling of “guanaco,” a llama-like animal, and *pampa* means “field” in the indigenous language Quechua. No traces of any pre-Inca civilization have been found at Huanuco Pampa, suggesting the conquerors built it from scratch. Decades of excavations conducted by U.S. and Peruvian archaeologists, including Morris, at the site until 2015 exposed a city carefully planned as a kind of provincial replica of Cuzco. Huanuco Pampa's civic buildings, dwellings, and urban layout follow the style of the capital city, as does much of its material culture. Most of the pottery that has been found at Huanuco Pampa, for example, is identical to that uncovered in Cuzco. Morris also identified evidence of Inca-style gender separation at Huanuco Pampa, where one area of the city was reserved for



female weavers and cooks, as evidenced by the sizable number of spindle whorls for knitting, large ceramic pots for preparing and serving food, and brooches for holding shawls.

Among Huanuco Pampa's 3,700 structures, archaeologists have also found evidence of the rigid class stratification that characterized Inca society. Successive emperors are believed to have stayed in an elite residential quarter facing the plaza during stopovers in the city on journeys from Cuzco. This sector's precisely cut and fitted stonework proclaims that it was intended to be occupied only by the very privileged. Spanish colonial accounts suggest that the Inca populated their new city in part with migrants from the capital known as *mitmaq*. All across the Inca Empire, these colonists were tasked with strengthening Inca control by bringing customs from the capital and diluting those of local populations. At Huanuco Pampa, distinctive pointy-bottomed pots and drinking vessels with an Inca-style flaring rim and incised geometric decoration provide archaeological evidence

confirming the presence of these people.

At the center of Huanuco Pampa is a huge plaza where, in Inca times, the region's peoples gathered to participate in what archaeologists believe was a mix of coercion and spectacle orchestrated by their new Inca overlords. At 47 acres, the plaza was larger than the one in Cuzco, and was dominated by Huanuco Pampa's most distinctive feature—a huge, rectangular ceremonial platform, covering nearly half an acre. Inca stonemasons, likely from Cuzco, built this platform, the largest in the empire, with dressed stones perfectly fitted into four mortarless walls. From atop this platform, Inca elites would act out rituals or shout out harangues to the assembled crowds. Spanish colonial texts suggest that these assemblies were both celebrations and military rallies. Sometimes they were presided over by the visiting Inca emperor himself, known simply as “the Inca.” Relaying accounts of people who had witnessed the ceremonies, a Spanish chronicler wrote in 1553: “The Inca and three of his lords ascended [the platform] to speak to the people, and to see the army when they made their reviews and assemblages.”

WITH ITS TRANSPLANTS from Cuzco and visits from imperial elites, Huanuco Pampa operated as an outpost of Inca culture and pageantry centered on the extravagantly large plaza. “A plaza like the one at Huanuco Pampa would have been vacant for most of the year,” says archaeologist Alan Covey, an expert on Inca urban planning at the University of Texas who surveyed the site in 2015. “But then it was activated during the imperial festive cycle when the Inca would bring tens of thousands of provincial people to the site for feast days.” These cycles were associated with important astronomical dates, such as the equinoxes and solstices, which marked the beginning or end of planting cycles.



A carved animal, believed to be a puma, decorates the ritual platform at Huanuco Pampa. The artists did not finish their work, evidence, perhaps, of the city's sudden collapse.



A gate inside Huanuco Pampa's elite quarter is decorated with carved animals and shows the fine stonework that indicated high status in the Inca realm.

On those dates, in Cuzco and in provincial cities alike, the Inca would invite delegations of conquered peoples to file into the central plaza in a specific order according to the date of each group's subjugation, acting out the history of conquest. Covey believes there is no question that this happened at Huanuco Pampa. "Each group had its designated spot in the plaza, so the gathering became a map of the provinces," he says. Inca governors would then move among provincial groups, designating local chieftains as representatives and obtaining commitments from them to send tribute in the form of food or manufactured goods. "The procession of entry into the plaza recapitulated the history of the province," explains Covey, "and the spatial order in the plaza created a sort of living map that helped imperial governors to rule in real time."

A softer kind of power was also exerted in the plaza by the Inca governors of Huanuco Pampa through the performance of mass weddings. In 1562, a Chupaychu man named Juan Xulca told the Spanish chronicler Íñigo Ortiz de Zúñiga that an Inca high official would come once a year to visit for this purpose. "In the plaza, in front of everybody, he gave each Indian man his Indian woman," Xulca reported, "and when he gave it, he told him to take her for

his wife and treat her well and don't lie down with another, and the woman would say the same." Accused murderers and adulterers endured public trials in the plaza and, according to Xulca's account, unrepentant killers would be taken a short distance away and executed. Adulterers were stoned or beaten.

Performance and music occupied vital roles in Inca civic life, and, at Huanuco Pampa, they were on full display in the plaza. In 2015, Miriam Kolar, a visiting scholar at Amherst College who works in the field of archaeoacoustics and examines how ancient societies employed sound in rituals and performances, led a team that measured how sound traveled across the plaza in order to discern how Inca

lords might have communicated with the masses. Judging from colonial accounts, public events in the plaza probably included seasonal ceremonies and community-building rituals, such as competitions and songs and dances by regional ethnic groups. Using recording devices mounted on tripods, Kolar found that the sound of a trumpet fashioned from a conch shell of the genus *Strombus*, a type of instrument widely used in ancient Andean ceremonies, carried clearly across the plaza, even in strong winds. The shell's sound traveled much better than human voices, Inca-style whistles, or wooden clappers. Even if the plaza were filled, a conch shell blast would have demanded everyone's attention. "People were being integrated into the Inca system at this time, and sensory communication



This massive platform at the center of Huanuco Pampa was the setting for Inca lords to address their recently conquered subjects and impress them with the empire's might.

was an important part of that,” says Kolar. “The plaza operated as this dynamic, experiential space, and the platform was an ideal setting for the imperial elite to stage and disseminate state messages through sound and spectacle,” an essential task as the Inca consolidated their control over restive locals.

The Inca had another very effective tool for exerting power. They were experts at food conservation, and built nearly 500 stone food-storage towers called *colcas* on the hillside south of the city. Local Inca governors could give—or deny—food to subjects during times of drought. Morris, along with Donald Thompson of the University of Wisconsin, excavated 95 of these structures in the 1970s and found remains of potatoes, maize, and lima beans, as well as underground ventilation ducts designed to keep them fresh. The potatoes were lying between layers of straw that had absorbed moisture and preserved them for centuries. Morris and Thompson believed the Inca built more storehouses than a city the size of Huanuco Pampa would ever have needed, suggesting they may have been built to feed the masses at festivals and to impress local people with their control over food supplies.

ACROSS THE SITE FROM the food-storage units stands an unfinished temple to the Inca sun god, an eloquent testimonial to the sudden death of this city of great ambitions. To one side of the building, carefully quarried and polished stone blocks lie in a jumble on the grass. Some still have the protrusions quarry workers used to grasp and carry them. Once the blocks had been fitted into the building, those



A stone block retains the protrusions used to move it. Stonemasons would normally have chiseled off these protrusions, but the wall was never completed.



One of two lodges known as *kallankas*, which are thought to have been where the Inca held banquets, including one feting a band of conquering Spaniards on the eve of the city's demise

handholds would have been filed off to create the finished look a structure of its importance and elegance warranted. The temple's front door still boasts the double jamb that the Inca reserved for high-status structures. At some point, probably soon after the Spaniards arrived in 1532, construction on



This stone bath was reserved for Inca royalty, including the emperor Atahualpa on his visit to Huanuco Pampa.

the building abruptly stopped. The stoneworkers either fled or died in the ensuing epidemic of European germs to which they had no immunity. Their world would soon be eradicated.

In 1533, several dozen Spaniards under the command of Hernando Pizarro marched from the Pacific coast to the interior city of Jauja, where they knew the Inca commander Chalcuchima was garrisoned with his troops. Vastly outnumbered, Pizarro talked the commander into accompanying him and his men to the far-northern city of Cajamarca, where, unbeknownst to Chalcuchima, the Inca emperor, Atahualpa, had been taken hostage by Pizarro's brother. Heading north along the Inca Road, the Spaniards, who were riding horses that Chalcuchima's own men had shod with silver and copper, would have seen Huanuco Pampa's majestic, pointed roofs from miles away. They descended the same flagstone path where today shepherds tend their livestock and entered the city. “This town was big, and...there



Sixteenth-century woodcuts by native Peruvian illustrator Felipe Guamán Poma show (left to right) Inca stonemasons, a man blowing a conch shell of the kind used in Inca ceremonies, the *colcas* where the Inca stored food and kept accounts on a stringed ledger known as a *kipu*, and the last Inca emperor, Atahualpa, held prisoner by a Spanish conquistador in 1533.

the people received well the captain and the Christians, and for two days they made many festivities,” wrote the Spanish chronicler Francisco de Xérez. Chalcuchima likely feted the Spaniards inside two lodges known as *kallankas*, a Quechua word meaning “hall” where Inca authorities held banquets and received distinguished visitors. Each of these two buildings was more than 200 feet long and had nine stone-bordered postholes into which were fixed enormous timbers that once supported 40-foot-high thatched roofs, towering above the city. Nearby, through gates decorated with carved images of animals, perhaps pumas, the Spaniards would have seen the room where Atahualpa himself stayed when he visited and the skillfully carved stone bath reserved for his exclusive use.

Although the original walls of that small room still stand, in other places workers have been reerecting fallen walls as part of a multiyear conservation and restoration project under the supervision of archaeologist and site director Luis Enrique Paredes. Often Paredes has had to use recently quarried stones to replace Inca blocks taken by local people to build their houses. He has found it challenging to re-create the Inca style using modern metal tools. “The Inca used only stone tools to work stone,” Paredes says. “They had copper, of course, but that’s useless for cutting and polishing stone.” In some locations, researchers have shoveled out layers of post-Inca soil and carried out spot excavations, revealing floors and basic infrastructure such as drainage culverts, a small hint of the once-grand city’s infrastructure.

The Spaniards’ arrival that day in 1533 marked the beginning of the end of Huanuco Pampa, as the city would soon go from proud outpost of Inca power to ruin. One man told the chronicler Ortiz de Zúñiga that he watched the population in his district fall from 4,000 to 800 as “everyone” died from European disease. Others described to him their shock at how the Spaniards ignored Inca class distinctions and put all their new subjects to work, including the elderly, children, and local chieftains, “who were required to pay tribute like the rest of the Indians, which they had not had to do in the time of the

Inca.” Paredes believes the city’s decline may actually have begun before the Spanish conquest, during a civil war between rival Inca leaders Atahualpa and Huascar that ended with the latter’s capture and murder in 1532. The following year it was Atahualpa’s turn—he was put to the death by the Spaniards on



The ruins of an unfinished temple on the edge of Huanuco Pampa are evidence of the rapid abandonment of this once-great city.

July 26, 1533. By then, smallpox was already making its death march down the Andes. “The calamities that ended the life of Huanuco Pampa came in a chain,” Paredes says.

A few years after Pizarro’s visit to Huanuco Pampa, Spanish settlers arrived and built crude stone houses in the plaza and turned the *kallankas* into horse stables. European animals grazed in the plaza where, only a few years earlier, the Inca had presided over thousands of his subjects. By 1541, the Spaniards had tired of the city. They built their regional capital, the modern city of Huanuco, in a valley about 120 miles east and several thousand feet closer to sea level. Thereafter, only shepherds and a few descendants of the inhabitants of the old Inca Kingdom occupied the site of Huanuco Pampa. Some may even have remembered this grand city and the fallen world it represented. ■

Roger Atwood is a contributing editor at *ARCHAEOLOGY*.

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Spike Island sits in the middle of Cork Harbor. The British built a series of forts on the island beginning in the late 18th century, but during the mid-19th century, the island was used to house thousands of Irish prisoners.

LETTER FROM IRELAND

THE SORROWS OF SPIKE ISLAND

Millions were forced to flee during the Great Famine—some of those left behind were condemned to Ireland's most notorious prison

by JASON URBANUS

In the mid-nineteenth century, Ireland was in the midst of a crisis. The repeated failure of the potato crop had driven millions of people to the brink of starvation. This catastrophe, combined with the simmering social, religious, and political tensions associated with British rule in Ireland, forced thousands of people to flee the country each month. Many of them

left from the small town of Cobh, in Cork Harbor. During the nineteenth and early twentieth centuries, as many as 2.5 million Irish men, women, and children departed from Cobh alone, more than from any other port in Ireland. Tearful families gathered on the waterfront to say their goodbyes. Many were seeing their loved ones and their homeland for the last time.

As they sailed out through Cork Harbor, they passed a foreboding island on their right featuring a bleak stone fortress that must have struck a jarring contrast to the colorful rows of Victorian architecture that lined the streets of the town they had just left behind. The island was known all over Ireland, and everyone who sailed past it must have shuddered. It was Spike

LETTER FROM IRELAND



Island, the site of Ireland's most notorious prison.

Located along Ireland's southern coast, Cork Harbor is perpetually bustling with activity. Pleasure yachts, cruise ships, tour boats, even Irish naval vessels, crisscross its waters. At its northern end lies the mouth of the River Lee, and farther inland, Cork, the Republic of Ireland's second-largest city. In the early twentieth century, the harbor's scenic town of Cobh gained some notoriety for its link with two famous maritime disasters—it was the last port of call for *Titanic* in 1912 and, three years later, *Lusitania* was torpedoed just off its shores. Memorials to both tragedies stand close to its waterfront.

Today, Cobh is perhaps best known as the place to catch the ferry to Spike Island, which is one of Ireland's most popular tourist attractions. Once the site of the largest prison in the British Empire, Spike Island was described by those held there as hell upon earth. Early on, it was a place synonymous with death—more than 1,000 prisoners perished in its first seven years of operation. The British, who controlled Ireland until 1921, conceived of the prison as a solution to what authorities saw as the increasing criminality of the Irish people. While Spike Island did house hardened criminals and political prisoners—most famously Irish nationalist John Mitchel, for whom the fort that became the prison is now named—many confined there were petty thieves who had fallen on hard

times and committed small crimes to make ends meet. In the 1840s, even minor offenses could get someone sent to Spike Island. As the years wore on, some inmates were sent to Australia, some

returned to their homes in Ireland, but many never made it off the island.

The 104-acre island was under the ownership of the British and, later, the Irish military from the late eighteenth century until 2011, when it was transferred to the civilian Cork County Council. This provided the opportunity for archaeologists to explore Spike Island for the first time. University College Cork bioarchaeologist Barra O'Donnabhain began a project in 2013 that included not only excavations at various sites across the island, but also a deep dive into government archives, firsthand accounts of prisoners, offi-

cials, and guards, and other historical sources. Over the past six years, O'Donnabhain and his team have helped untangle some of the site's history and gained new insight into how the nineteenth-century British penal system in Ireland functioned. Along the way, they have uncovered evidence of Spike Island's operational deficiencies, deplorable living conditions, and institutional racism. They have also revealed the respectful behavior some prisoners exhibited toward their fellow inmates upon their deaths.

Beginning in the late eighteenth century, the British constructed a series of fortifications on the strategically located Spike Island. Its location opposite the narrow mouth of Cork Harbor ensured that any ship entering or exiting had to sail past its guns. The first fort was built during the American War of Independence as a defense against a potential American attack. A second network was erected during the French Revolution, and



Spike Island's star-shaped fort was built beginning in the early 1800s after the rise of Napoleon. The fort wasn't completed until mid-century, when Irish convicts held there were forced to finish its construction.

a third, much more substantial fort, known as Fort Mitchel, was begun in 1804 after the rise of Napoleon. This star-shaped complex contained massive bastions, ramparts, and a moat, but was only partially completed when work was halted in 1820. It would not be fully completed until decades later, built by the very inmates incarcerated behind its walls.

Around this same time, the British penal system was beginning to evolve.

of the poor and criminal classes by shipping them out of the country. In the eighteenth and nineteenth centuries, one of the fundamental tenets of the British penal system was transportation. Under this system, people convicted of felony offenses were involuntarily exiled to distant colonies across the British Empire. It was common for an Irishman or Irishwoman to be sentenced to seven years transportation to Australia, whereby they were deported

neering. They were looking for a working class for Australia.”

Spike Island played a major role in the British penal system in Ireland—but it was only supposed to be a temporary solution to a developing crisis. By the mid-nineteenth century, the British government was running out of places to send Irish convicts. Since the 1780s, they had been sent to Australia, but colonial authorities there were growing wary of the practice and began to resist. As it took longer and longer to find suitable places to send Irish criminals, Irish jails became exceedingly crowded and increasingly dangerous.

Another factor contributing to perilous overcrowding was the Great Famine, which lasted from 1845 to 1852. This catastrophe caused the deaths of up to one million people, but millions of others were driven to wander the countryside in search of food. Many of them resorted to crime in order to survive, stealing food, animals, or small items to trade or sell. Those who were found guilty of felony grand larceny were commonly sentenced to transportation. But many British statutes had not been updated in centuries, and the definition of felony grand larceny had not changed since the thirteenth century. It was still defined as the theft

of any property valued over one shilling, even after centuries of inflation. This meant that stealing even the smallest of items was punishable by transportation. Not only had it become

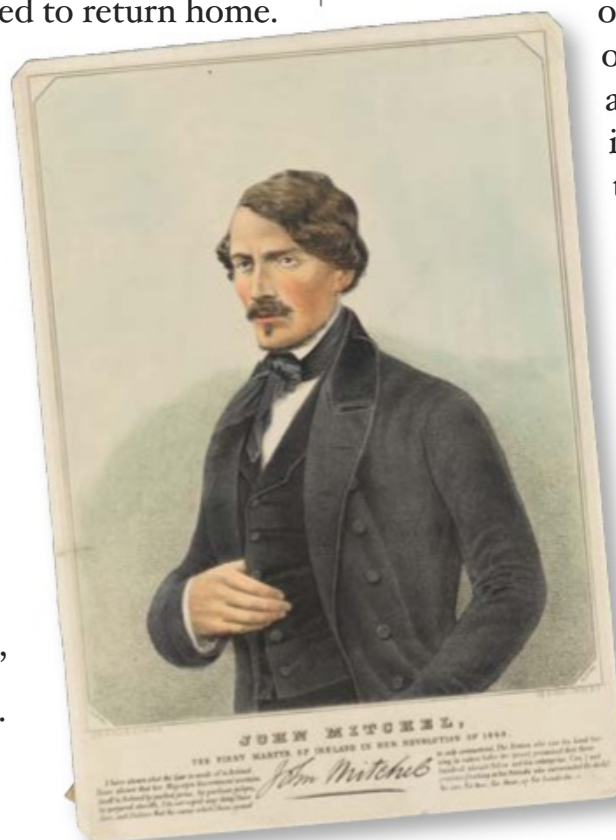


A view from Spike Island toward the mainland and the town of Cobh, from which millions of Irish emigrants departed during the 19th and early 20th centuries.

Prior to the nineteenth century, lawbreakers were incarcerated for brief periods of time in small local holding cells. The concept of larger, permanent prisons was unknown in the British Isles, but that was soon to change. “Ireland had no purpose-built prisons in 1800, but, by 1830, every single county had a jail, and all the big towns had a city jail,” says O’Donnabhain. He believes that the events of the French Revolution, which unsettled the British upper classes, may have had a direct impact on this movement. “It’s the fear of the poor, the fear of revolution that does this,” he says. “It’s like they said, ‘We have to make sure that this doesn’t happen here. How do we do that? We lock them up.’”

Another way the British prevented popular unrest was to simply dispose

from Ireland and pressed into penal servitude. When they had completed their sentence, they were freed, but they were not allowed to return home. For the British, this process achieved two objectives: It rid society of people they considered undesirable, and, at the same time, supplied their colonies with a much-needed labor force. “What they were doing was harvesting the poor and sending them away,” says O’Donnabhain. “It was social engi-



Irish nationalist John Mitchel served time as a political prisoner on Spike Island in 1848. The island’s fort was later named for him.

LETTER FROM IRELAND



The fort's original soldiers' barracks were transformed into a cellblock for inmate housing. Each room was intended to hold 13 British soldiers, but authorities forced as many as 50 Irish prisoners into each cell.

more difficult to ship Irish criminals away, but the number of them was also growing exponentially. To alleviate the stress affecting Ireland's jails, the British government looked to the island in the middle of Cork Harbor.

Spike Island's size, its location, and its fort infrastructure convinced government officials that it would make an ideal depot where criminals could be held temporarily as transport ships were prepared. However, by 1853, transportation of small-time offenders was abolished and most Irish convicts began serving their sentences at home. This meant that Spike Island ended up housing prisoners longer than was originally intended. O'Donnabhain's recent research and excavations have shown that it was drastically unsuitable for this endeavor. Spike Island was never intended to

hold more than a few hundred convicts for a short amount of time, but it remained open as a prison for 36 years, and at its height had a population of around 2,500 inmates.

One of the major challenges, at first, was that there simply was not enough room for the number of convicts being sent there. "They immediately just jammed the place full of people," says O'Donnabhain. The fort's former military barracks were transformed into convict housing. Each room, which measured 48 feet long by 18 feet wide, had originally been intended to house around 13 British soldiers. Yet as many as 50 Irish prisoners were assigned to each of these quarters, almost four times the anticipated capacity.

Excavations have revealed why convicts frequently complained about Spike Island's notoriously bad drink-

ing water. While digging beneath the outdoor prison yard, O'Donnabhain's team uncovered pipes from Spike Island's overtaxed and inadequate sewer and freshwater systems. What they discovered was that, in fact, the two were occasionally one and the same. "We found that they were harvesting rainwater from the roofs of all the buildings and funneling it into a tank underneath the yard," he says. "Fresh water is going one way, sewer pipes are going another way, and they would have gotten mixed quite regularly. Conditions were grim."

Despite the draconian conditions, the men were able to occasionally break the monotony of prison life. During the recent excavations, dozens of small objects were found hidden beneath cell floorboards, stowed there safely out of the sight of prison guards. There were carved pieces of bone and

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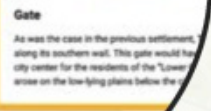
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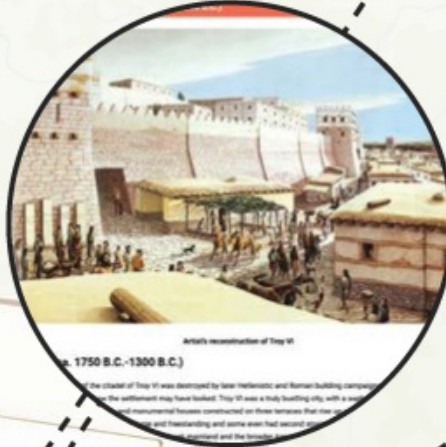
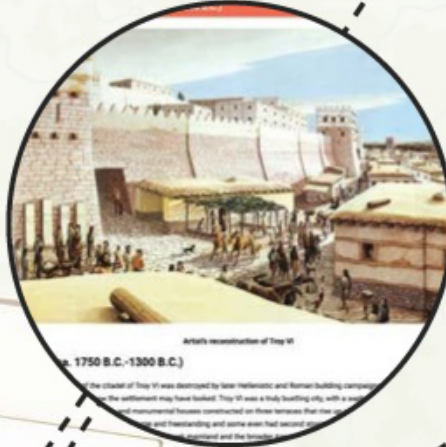
Presenting the Interactive Map of Troy



Gate
As was the case in the previous settlement, along its southern wall. This gate would have only been for the residents of the "Lower" zone on the low-lying plains below the hill.



Roman Odeion
The Odeion was a theater built in 100 AD after a visit to the region by the Roman Emperor Hadrian. The main components of the Odeion stage (originally wooden), the orchestra, and the tiered rows of seats could accommodate between 1,700 to 2,100 people for performance.



Artists' reconstruction of Troy VI
(c. 1750 B.C. - 1300 B.C.)
The citadel of Troy VI was destroyed by fire. Helms and other scholars believe that the city was a truly walled city, with a monumental wall. The wall was constructed on the remains of the wall of the previous settlement and some even had second-story towers. The wall was built by the Trojans and the Trojans.



Pillar House
The largest building in Troy VI is the so-called "Pillar House" because of the four large stone pillars that were found within it and that on its central room. It was a two-story building that of textile production activities.

Welcome to the Interactive Map of the Ancient City of Troy!

UNCOVERING TROY

We have created this online feature in commemoration of the 20th anniversary of Troy's being listed as a UNESCO World Heritage Site on December 2, 1998. Troy was chosen for its "exceptional universal value" due to its 4,000-year-old history of interactions between Near Eastern and Mediterranean cultures.

Learn more...



Come explore the long archaeological history of Troy! There were at least nine different settlements built during the 4,000-year history, creating a very complicated archaeological picture. Nonetheless, archaeologists have been able to untangle most of this complex history. On the map at the left, each color represents a different time period and certain archaeological features of each era. Click on the links below to read more about how the settlement and its inhabitants changed over time. Click a settlement layer to explore. Johnson, 2011.

All you need to tour 4,000 years of the archaeological history of Troy is a digital device. For centuries, the story of Troy has influenced cultures around the world. You can discover why just by clicking on the color-coded map. Learn about:

- The city's nine layers and each of their exciting stories
- The temples, gates, and other important buildings
- The people of both history and legend who defined Troy
- The amazing artifacts each era left behind
- The archaeologists who revealed Troy's mysteries

Start your adventure at archaeology.org/troy!

The AIA wishes to thank Richard C. MacDonald for his support of the Year of Troy project.

LETTER FROM IRELAND

stone, some of which were made into gaming pieces such as dominoes, while others were just small objects of prisoner art. These objects represent small acts of resistance to prisoners' highly regimented lives.

While no women were sent to Spike Island, children as young as 13

were held there, 200 of whom were housed in a windowless bunker-like building that had once been used as the fort's gunpowder store. Prison records indicate that most of the youths were sentenced to Spike Island for stealing items as trivial as umbrellas, handkerchiefs, or shoes.



Spike Island's punishment block was built after the murder of a guard in 1856 and contained 28 solitary confinement cells. Prison records indicate that draconian conditions there caused many men to go mad, and even to attempt suicide.

Some were sent there simply because they were homeless, as vagrancy had been criminalized. According to O'Donnabhain, the criminal justice system of the time was purposely stacked against the young. "They were really harvesting these kids for the colonies," he says. "They were looking for young, fit men and women. They're not going to bother transporting a 50-year-old; it's a waste of time and money. But teenagers—they were prime for the picking."

Life on Spike Island was, not unexpectedly, hard, as convicts were forced to work long hours on various government building projects around Cork Harbor. To help ensure the men's best behavior, each inmate's conduct was recorded on a badge that they were forced to wear on their sleeve. Prisoners who misbehaved were treated harshly. Originally, there was a series of 11 punishment cells. These were actually old soldiers' latrines resembling outhouses that were converted into isolation booths. After a prison guard was murdered in 1856, a new punishment block was constructed. Its cells were dark, cold, and known to drive some men to insanity. "It's all about sensory deprivation," says O'Donnabhain. "You were literally in the dark."

Spike Island's harsh conditions, poor medical care, and overcrowding led to an almost astronomical death rate, especially in the years during the famine when the prison first opened. The first prison ship docked at the island in October 1847 carrying 109 men. By the end of the year, two months later, seven of them were dead. That trend would get worse before it got better. Around 1,200 men and boys died on Spike Island throughout its three and a half decades as a prison. In its most deadly year, almost one prisoner was buried each day. The overwhelming majority of deaths

(continued on page 62)

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LETTER FROM IRELAND

(continued from page 60)

occurred in the first seven years, when conditions within the prison were at their worst. “They weren’t trying to kill them,” says O’Donnabhain, “there were just way too many people there.” It was not until penal reforms in the 1850s reduced Spike Island’s prisoner population from 2,500 to 900 that the numbers of dead finally began to drop.

The main cause of prisoner death was disease, especially tuberculosis. Records kept by prison officials blame Spike Island’s cold, windy climate for the spread of the disease. But officials also expressed the opinion that there was not much they could do since the Irish were constitutionally vulnerable to disease—a notion at which O’Donnabhain balks. “There is a whole aspect of race that permeates throughout this place,” he says. “The Irish are not particularly susceptible to tuberculosis—people who are mal-

nourished and living in overcrowded conditions are.”

Over the past few years the project has investigated one of Spike Island’s two known cemeteries. Records show that the famine-era cemetery, which contained around 1,000 inmates, was located on the east side of the island. It was subsequently buried beneath 20 feet of debris during landfilling to improve Spike Island’s defenses and

A photo dated to 1860 shows inmates building additions to the island’s defenses.

has never been firmly located. With the help of old maps of Spike Island, O’Donnabhain and his team discovered a second graveyard, which opened around 1860, on the western side of the island. This provided them with the opportunity to examine some of the inmates’ physical remains and to evaluate how the dead were treated. “We wanted to see the impact that Spike Island had on the bodies,” says O’Donnabhain. “Historical records say that tuberculosis was the main cause of death, so we wanted to see if we could confirm that, and whether we could see any other processes.”

Chemical analysis of isotopes left behind in skeletal remains can identify certain information about a person’s diet. The men who were buried in the second Spike Island graveyard died in the 1860s and 1870s, but had grown up in Ireland during the Great Famine. Their life history of starvation was evident in their bones. Other tests



Small carved stone artifacts such as these were discovered by archaeologists beneath two cellblocks’ rotted floorboards. Prisoners had stored the objects there to keep them from being confiscated by guards.

showed that the poor diet provided to the inmates while on the island caused many of them to suffer from xerophthalmia, a condition triggered by vitamin A deficiency that can lead to night blindness and, in some cases, even total blindness.

One of the most surprising findings from the graveyard excavation was its high degree of organization and the level of care shown to each inmate's burial. The small plot of land was laid out in uniform rows, similar to a military cemetery. On rare occasions, when an inmate died under unusual circumstances such as suicide, a carved headstone was provided. Each individual was also buried in a coffin, which the team did not expect. "That really surprised us," says O'Donnabhain.



An 1849 *Illustrated London News* engraving shows Spike Island from the Irish mainland.

Researchers discovered something even more surprising when they

analyzed the coffins in the lab—they noticed that they were made from a

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LETTER FROM IRELAND

different material than the team had originally thought. While the coffins were actually constructed from cheap wood, such as pine, they were painted to look as if they had been made from a more expensive material, such as oak. Thus, the dead would not appear to have been given a poor man's burial, but, instead, something more dignified. This respectful gesture testifies to a sense of camaraderie among the convicts. "All of the grave digging and coffin building was done by other prisoners," O'Donnabhain says. "It's not being done by guards, so that was really an interesting result."

However, the most peculiar discovery from the graveyard excavation was that around 10 percent of the exhumed skeletons were found to have parts of their skulls missing. O'Donnabhain suggests this may be evidence for autopsies that were carried out by Spike Island's medical officers. But examination of the skull is at odds with normal autopsy procedures for a tuberculosis victim. Moreover, there is no evidence that the prisoners' chest cavities were examined, as would have been normal for someone who died of the respiratory disease. Instead, O'Donnabhain believes that this highly unusual practice may have been associated with pseudoscientific theories of the time popularized by Italian physician Cesare Lombroso. These theories promoted the idea that certain individuals were naturally more prone to committing crimes than others, and that this "criminality" manifested itself in anomalies of the brain. "I'm tempted to link it to the idea of the natural-born criminal and that they wanted to see what is going on in the criminal mind," O'Donnabhain says. "This biological notion of natural criminality hasn't gone away, even today."

The Spike Island prison finally shut its doors in 1883, at which time the island reverted to



One of the two known prisoners' graveyards (top) was discovered on the western side of the island. A very few inmates had headstones (above left) marking their burials, and about 30 skeletons (above right) were exhumed for scientific testing.

British military control. Overhauls to the British and Irish penal system had improved conditions, but, in the end, Spike Island's ill-suited infrastructure and the exorbitant cost of running a prison on an island made it unfeasible to maintain. However, in 1985, after a 102-year hiatus, Irish authorities returned the island to its roots by once again installing a prison there. It was soon the scene of an internationally publicized riot and was eventually shuttered after two decades.

Although a visit to Spike Island today provides serene and picturesque views across Ireland's greatest harbor, there is darkness beneath its beauty. America and Australia are known

for their vast numbers of Irish immigrants. Some men and women went willingly, some did not. Whether they arrived at their destinations free or not, each eventually faced the difficult task of rebuilding their lives in a distant foreign country. All of them, though, had a chance to escape the bleak future that famine-era Ireland offered. The recent archaeological work on Spike Island has helped tell the story of those men and boys who were not able to make it out and provided a voice for those who still remain buried beneath its ground. ■

Jason Urbanus is a contributing editor at
ARCHAEOLOGY.



GLOBAL CELEBRATION OF ARCHAEOLOGY GETS BIGGER EACH YEAR



Since its inception in 2011, International Archaeology Day (IAD) has grown in terms of events, attendance, collaborating organizations, and participating countries. IAD 2019 was the largest celebration to date. We estimate that over 250,000 people

attended more than 1,200 public events organized by 500 collaborating organizations in over two dozen countries.

IAD is an affirmation of the global interest in archaeology. The diversity of events is a testament to the creativity and passion of



the many individuals and organizations committed to informing and educating the public. IAD has something for everyone, whether it is a visit to the 2,000-year-old archaeological site of Sungai Batu in Malaysia or a crash course in forensic archaeology in Rome. To read more about these programs and to find out more about IAD, visit

archaeologyday.org.

IAD 2020 will be held on October 17 and will be the 10th anniversary of this global celebration of archaeology. We encourage you to get involved in the festivities by attending an event or organizing an IAD program.



Roman reenactors with ArchaeoCon 2019 attendees

GET READY FOR ARCHAEOCON 2020

Join us for ArchaeoCon 2020 on Saturday, January 4, 2020, at the Marriott Marquis Washington, DC. ArchaeoCon is a day of entertaining programs, workshops, and demonstrations that showcase archaeology and the AIA. Booths and exhibits hosted by local archaeological organizations and AIA societies will feature activities and hands-on experiences. Attendees will also have an opportunity to hear from and talk to leading archaeologists.

Headlining the festivities are space archaeologist Sarah Parcak and television personality Josh Gates. Parcak is an Egyptologist, remote sensing expert, and associate professor of anthropology and director of the Laboratory for Global Observation at the University of Alabama at Birmingham. She is also the winner of the 2016 TED prize. Gates is an archaeologist, adventurer, television personality, and author. He is the host and executive producer of the smash-hit Discovery Channel series *Expedition Unknown* and *Legendary Locations* on the Travel Channel.

ArchaeoCon is a great opportunity to enjoy archaeology, meet archaeologists, learn about all that the AIA does, and introduce friends and family members to the Institute. Visit archaeological.org for more information.



DISPATCHES

FROM THE AIA

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CHANGES TO AIA MEMBERSHIP

The AIA has launched a new online membership system. The new system gives AIA members direct access to their membership information and allows societies to better communicate with members about lectures and other upcoming events. Along with the new system, we introduced several new categories to better meet the needs of our diverse range of members. To learn more about these categories and

associated benefits, visit archaeological.org/join. To log in to the new membership system, please refer to the instruction email that was sent to current AIA members. If you are a current AIA member and you did not receive an instruction email, please contact membership@archaeological.org. Please note that the membership system login is not the same as the AIA website login.

AIA & SKYPE A SCIENTIST

The Skype a Scientist program connects scientists, including archaeologists and those in related fields, with classrooms around the world. The AIA encourages its professional members to participate in the Skype a Scientist program as a means of engaging in public outreach.

For archaeologists, sign-up is done via an online form on the Skype a Scientist website. When you complete the form, it will ask if you are part of an academic society that is participating as a group. AIA members should respond with "Archaeological Institute of America." We encourage teachers to visit the Skype a Scientist website and fill out a form to be matched with a scientist and offer your classroom the chance to learn more about archaeology. Find out more at archaeological.org/programs/educators/aia-skype-a-scientist.

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The 121st Joint Annual Meeting of the Archaeological Institute of America and the Society for Classical Studies will take place January 2–5, 2020, at the Marriott Marquis Washington, DC. The conference is expected to draw nearly 2,500 attendees, ranging from professionals in the field to students and archaeology enthusiasts. The latest information on the meeting, including the program, registration, and hotel/travel, is available online at archaeological.org/annualmeeting.

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The 2020 AIA calendar, "A Year of Archaeology," features stunning archaeological images from around the world that were submitted to the AIA's Annual Photo Contest. The calendar makes a wonderful gift for the archaeology lovers among your friends and family. All proceeds support AIA programs, including our site preservation efforts, which are helping to protect and preserve more than two dozen sites around the world. Buy your calendar today at archaeological.org/calendar.

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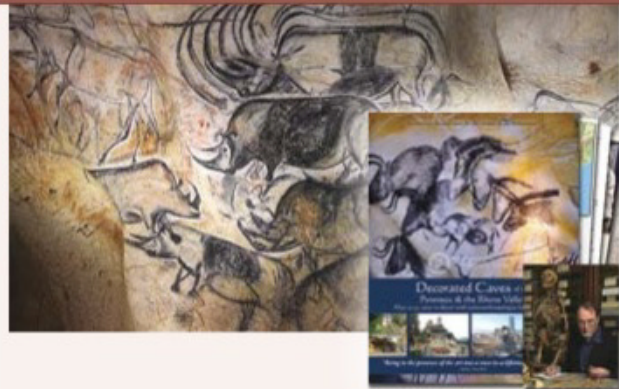
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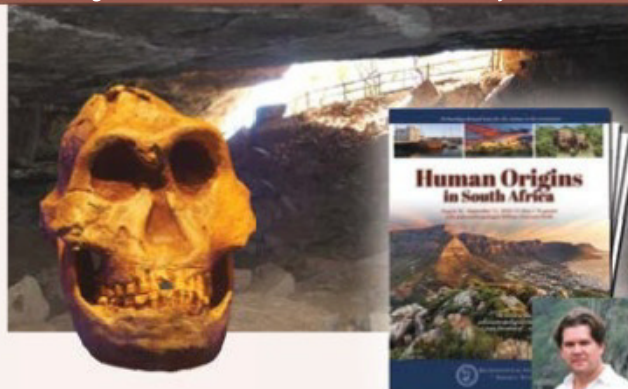


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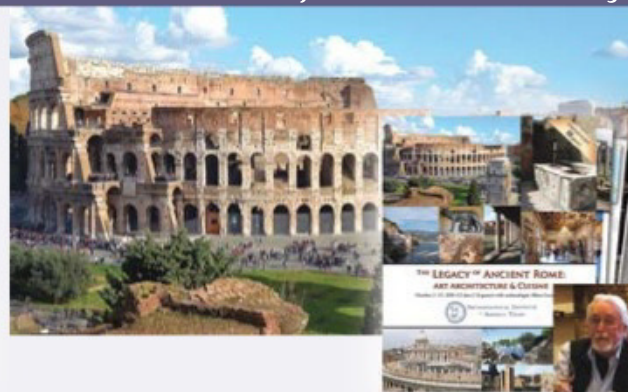


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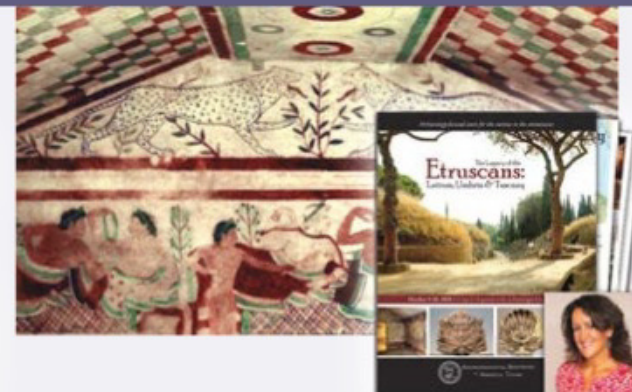
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Feeding babies is a universal human practice, so it may be surprising that archaeologists know very little about what infants and young children in prehistoric societies consumed apart from their mothers' milk. "Ancient children have been overlooked," says biomolecular archaeologist Julie Dunne of the University of Bristol. "We do not have any direct evidence of how and what babies were fed." Because prehistoric children's graves are uncommon, there are relatively few remains to test to determine what they ate. In order to supplement the meager skeletal evidence, Dunne and her team sampled residues from three spouted vessels found in infants' graves at two sites in Germany dating to between 1200 and 450 B.C. Some scholars had hypothesized that these vessels were buried with the children because they were the prehistoric equivalent of baby bottles. Dunne was able, for the first time, to show conclusively that they were in fact used to wean babies with the milk of ruminants such as goats or cows.

Dunne's research has important implications beyond the detection of the animal milk residue and identification of the function of these vessels, of which there are many other similar prehistoric examples. The transition from a hunter-gatherer to a pastoral lifestyle resulted in improved nutrition from animal milk and freed up time to nurture more children, resulting in a massive population explosion. "You can make a direct connection from these bottles to the growth of cities and the way we live today," says Dunne. For her, the study also went beyond science. "This project gave me a real sense of love," she says. "I felt such a connection to the people who used these bottles to feed their children."

WHAT ARE THEY
Drinking vessels
CULTURE
European Bronze and Iron Ages
DATE
1200–450 B.C.
MATERIAL
Ceramic
FOUND
 Berlin GERMANY Dietfurt Augsburg-Haunstetten
DIMENSIONS
From 2 to 4 inches wide





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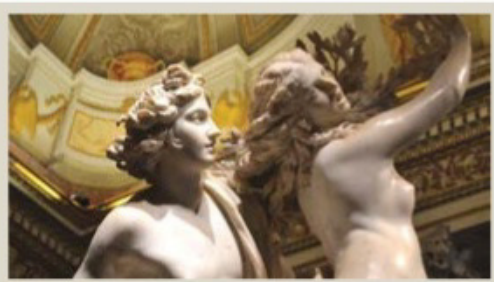
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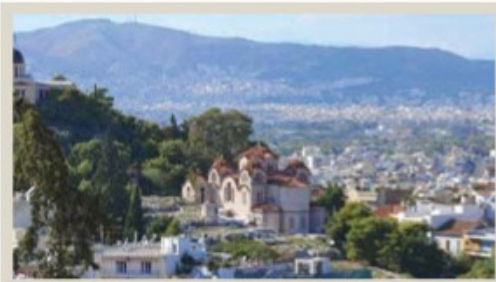
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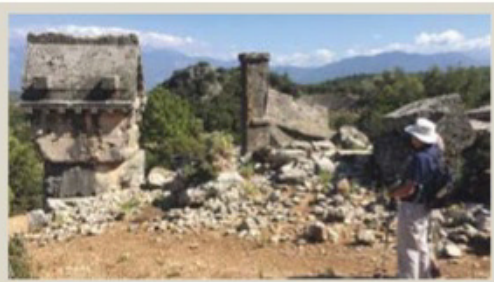
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NATURE AND FOOD



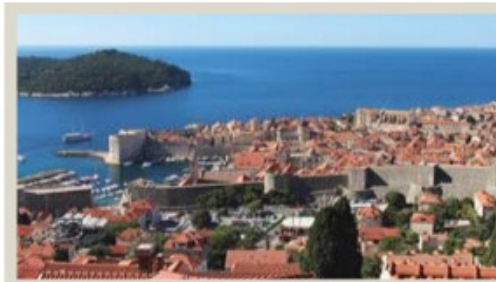
IN THE FOOTSTEPS OF
ALEXANDER THE GREAT IN TURKEY



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GULET CRUISES AND PRIVATE CHARTERS

